THE IRON AGE

New York, July 12, 1917

ESTABLISHED 1855

VOL. 100: No. 2

Properties and Structure of Nickel Steel

Effect of Annealing at Various Temperatures-Proper Practice to Obtain Best Results on Large and Small Forgings

BY S. W. PARKER*

HE following experiments were made in order to determine the best annealing temperatures for two grades of 3.50 per cent nickel steel, commonly used for forgings.

In practice forgings are annealed in order to accomplish any or all of the following:

Relieve forging strains.

Produce good machining qualities.

To so refine the grain or structure of the steel as to produce the best physical properties possible without heat treatment.

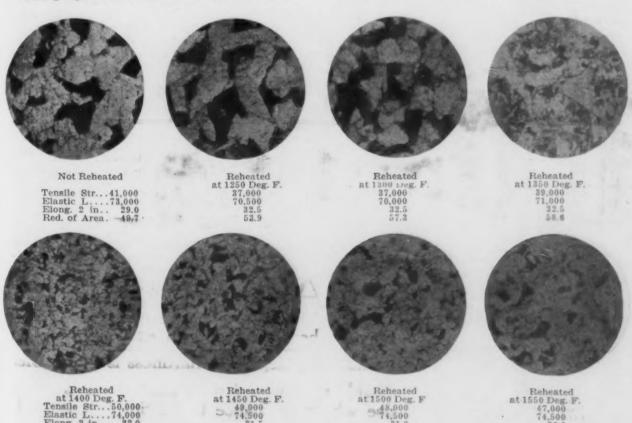
The experiments here reported were made on small forged bars, but practical experience has proved that the conclusions arrived at may be applied to large forgings, the increase in mass being balanced by an increase in the time of heating to and soaking at the annealing temperature. The actual physical properties obtained will of course depend largely on the amount of reduction from the ingot to the forging; the greater the reduction in forging the more likely will the physical properties of a longitudinal test be within limits.

The test bars used were forged down to 1 in. square by 6 in. long from two 4 x 4-in. billets of different grades which had the following composi-

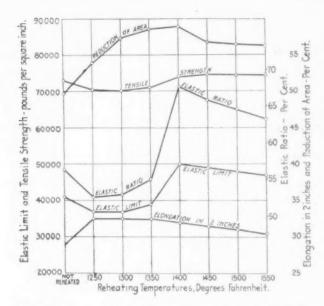
Carbon. Per Cent	Phos- phorus. Per Cent	Man- ganese, Per Cent	Sulphur. Per Cent	Silicon, Per Cent	Nickel, Per Cent
0.22	0.011	0.38	0.028	0.12	3.16
0.41	0.033	0.55	0.049	0.14	3.40

After becoming cold these bars were heated to 1850 deg. Fahr. and kept at that temperature or higher for two hours. At the end of that time they were removed in a mass and buried in a box containing a mixture of powdered magnesia and asbestos, where they cooled very slowly. This first heat-

Testing department, Bethlehem Steel Co., Steelton, Pa.



Photomicrographs, 100 Diameters, of Nickel Steel Containing 0.22 Per Cent Carbon and the Physical Results at Different Temperatures



100000 -55 PENSILE STRENGT -50 J square 190 80000 545 pounds 40 Per 70000 Ratio-Strength -Reduct 60000 50000 and -30 Elastic Limit 40000 -25 30000 -21 1400 1450 Reheating Temperatures, Degrees Fahrenheit.

Effect of Various Annealing Temperatures on 0.22 Carbon Nickel Steel, Heated to 1850 Deg. Fahr. and Cooled Slowly, Reheated to Temperatures Varying from 1250 to 1550 Deg. Fahr.

Effect of Various Annealing Temperatures on 0.41 Carbon Nickel Steel, Heated to 1850 Deg. Fahr., and Cooled Slowly, Reheated to Temperatures Varying from 1250 to 1550 Deg. Fahr.

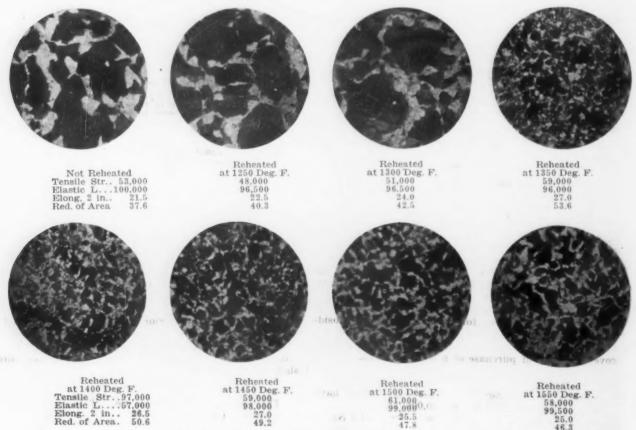
ing was done to enlarge the grain of the bars until it was about as coarse as that which is found in fairly large forgings before annealing. The experiments, therefore, were started with about the same conditions of coarse structure in the bars that exist in unannealed forgings.

One bar of each grade was set aside to be tested without reheating; the other bars were reheated in an electric tubular-muffle furnace to various temperatures between 1250 and 1550 deg. Fahr. This was done by placing a bar of each grade in the cold furnace with the end of a Le Chatelier pyrometer between them and heating to the required temperatures in from two to three hours, holding at this temperature for one hour, and then allowing the

bars to cool down to room temperature in the furnace

These two sets of bars were turned down to threaded tensile tests 0.505 in. in diameter and tested. The elastic limits were determined with a Berry strain gage, using increments of load of 1000 lb. per sq. in., and were in all cases very sharply defined. Pieces were cut from the ends of the tests for the examination of the structure and photomicrographs.

The physical properties of these tests were plotted against the annealing temperatures, as shown in the illustrations. The structure of each bar, together with its physical properties, is also shown.



Photomicrographs, 100 Diameters, of Nickel Steel, Containing 0.41 Per Cent Carbon and the Physical Results at Different Temperatures

Nickel Steel of 0.22 Per Cent Carbon

The minimum hardness and tensile strength were obtained by annealing at between 1250 and 1350 deg. Fahr., at which temperatures the structure had only started to break up and refine.

The percentage of elongation of this steel is naturally high on account of the predominance of ferrite, and the maximum elongation was reached before the structure had been refined. The reduction of area, however, was considerably affected by the grain size and reached a maximum in the test annealed at 1400 deg. Fahr., in which the structure had been completely refined.

The property most affected by annealing is the elastic limit. This was increased from 41,000 lb. per sq. in. in the unannealed bar to 50,000 lb. per sq. in. in the bar annealed at 1400 deg. Fahr., in which the grain was the finest in the series. This increase in elastic limit by refinement of grain plays an important part in annealing forgings, especially in cases where the specifications require high elastic limits together with good ductility.

The best combination of physical properties is obtained in this steel by annealing at a temperature ranging between 1400 and 1450 deg. Fahr.

Nickel Steel of 0.41 Per Cent Carbon

The hardness and tensile strength of this steel were also reduced to a minimum by annealing at between 1250 and 1350 deg. Fahr., and were not dependent on the grain size.

The elongation, in the case of this harder steel, was considerably affected by the size of the grain; it was lowest in the coarse-grained bar which had not been reheated, and reached a maximum in the bars annealed at between 1350 and 1450 deg. Fahr., in which the grain was finest. It will be seen that, as the annealing temperature was increased beyond 1450 deg. Fahr., the elongation decreased and the grain size grew correspondingly coarser. The reduction of area was similarly affected by the size of the grain.

As in the case of the 0.22 per cent carbon nickel steel, the elastic limit increased greatly when the structure was completely refined, the increase being, in this case, 6000 lb. per sq. in. It started to decrease in the bar annealed at 1550 deg. Fahr., the change being due to the coarsening of the grain.

For this steel the best combination of physical properties is obtained by annealing at between 1350 and 1450 deg. Fahr., the minimum temperature being lower than in the case of the 0.22 per cent carbon steel.

These results have been repeatedly checked in practice and the general conclusions are being applied in the annealing of forgings of all sizes.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has placed a contract with Stone & Webster Co. for the foundation of its new 84-in. plate mill, and the Dravo Construction Co., Pittsburgh, will build the foundation for the two 80-ton open-hearth furnaces. Work on these contracts will start at once. An appropriation of \$1,000,000 has been made by the Youngstown Sheet & Tube Co., for the account of its subsidiary, the Buckeye Land Co., to finance house building at East Youngstown this year. The appropriation covers the cost of purchase of a 300-acre tract.

S. Birkenstein & Sons, metal dealers, Chicago, have purchased between 50,000 and 60,000 sq. ft. of land at the northwest corner of Hawthorne Street and North Avenue, Chicago, on which it is planned to build a warehouse for their business.

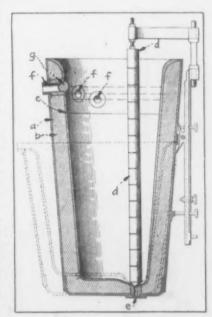
A Self-Skimming Ladle for Steel Foundries

A NEW type of ladle, known as a self-skimming one, has been invented by J. C. Davis, fourth vice-president of the American Steel Foundries, Chicago. It is especially adapted for pouring steel castings and is claimed as making it possible to expose 45 per cent less area of steel to the detrimental action of the slag than in the case of the old style ladle where basic slags are obliged to remain for a long time in contact with the metal. This is particularly the case in pouring castings, for the chemical reaction between the slag and the steel tends to lower the silicon content of the steel and to add oxygen and phosphorus to it.

The new type of ladle has the further advantage, it is claimed, of imparting a greater hydrostatic head to the metal, which the inventor claims has the effect of causing the lighter slag to rise to the top of the steel and remain there while the ladle is being emptied.

In making open-hearth steel it is almost impossible to produce an exact quantity of steel of the desired composition at one time because owing to various delays more metal than was contemplated in the original charge has to be added. It is therefore necessary that the ladle, which is to hold the steel and its slag, be of such ample proportions as to properly receive and constraint of the steel and constraint of the ste

tain the original charge and any such additional amounts which have to be added. Normally, therefore, when a heat of steel is discharged into its ladle there is so much space between the top of the steel and the top of the ladle that the ladle receives an excessive amount of slag, which re-mains usually in contact with the steel until the ladle is emptied entirely. The greater the volume of slag in ladle, the greater is the hydrostatic head or pressure exerted by the slag,



The New Type Ladle Which Skims Itself of Excess Slag. The Old Type Is Shown Relatively by the Dotted Line

thereby causing the latter to settle more deeply into the steel, increasing the slag's contaminating effect. These conditions are especially true in steel foundries.

As shown by the illustration the new ladle is of smaller diameter and is much deeper than the type of ladle usually used. It is pierced near the top with several circular openings which are staggered at different levels, the purpose being to provide outlets for the removal of slag.

Before the ladle is filled with steel, the slag openings are closed with a plug, composed mainly of silica sand with a binder of fire clay, and these plugs can be removed as required in order to regulate the height of the slag in the ladle to a proportion just sufficient to serve as a blanket to prevent chilling the steel. The ladle consists of an exterior shell, a, a brick lining, b, and a thinner lining, c, of material containing magnesite and dolomite. The stopper is shown at d, the pouring opening at e, and the slag holes at f. How the slag holes are plugged is illustrated at g.

The Standard Equipment Co., 47 Orange Street, New Haven, Conn., has recently taken over the entire plant and equipment of the D. & H. Mfg. Co., also of that city.

Exports Pass the Billion Dollar Mark

Movement of Iron and Steel Products to Foreign Lands Extremely Heavy During the Eleven Months Ending May—Submarine Not Curtailing Shipments

WASHINGTON, July 10.—Exports of iro nand steel for the 11 months ended May passed the billion dollar mark, their value being nearly double that of the ship-

Exports	s of Iron	and Stee	2L	
	N	Iay-	-Eleven	Months-
	1916, Gross Tons	1917, Gross Tons	1916, Gross Tons	1917. Gross Tons
Pig iron Scrap Bar iron Wire rods	22,293 24,889 7,364 15,684	61,112 11,382 7,886 15,666	237,629 138,842 64,463 153,483	751,524 227,909 58,730 130,130
Steel bars	142,782 2,494	62,541 168,158 2,204	564,121 845,803 28,688	697,740 1,745,363 26,748
Hoops and bands Horseshoes Cut nails Railroad spikes	3,280 1,051 614 1,959	6.405 319 368 1,332	37,249 11,757 4,084 24,306	42,213 4,022 4,251 16,828
Wire nails	12,205 745	10,133	111,575 8,567	114,857 16,513
tings	4,609	6,364	46,738	68,470
Radiators and cast-iron	12,400	12,563	113,446	153,400
house heating boilers Steel rails Galvanized iron sheets	198 48,841	$\frac{562}{49,260}$	$\frac{2,070}{492,038}$	3,887 $562,336$
and plates	7,536	8,141	69,496	82,296
plates Steel plates Steel sheets Structural iron and steel Tin and terne plates. Barb wire All other wire.	5,239 22,679 9,675 22,938 25,585 39,197 22,665	5,244 54,849 15,789 34,764 23,283 8,543 19,735	38,583 252,618 88,487 251,832 200,722 326,745 221,185	44,851 361,199 107,048 319,971 207,489 285,834 220,310
Total	540,591	587,900	4,334,511	6,253,831

ments for the corresponding months of 1916. Exports by values in May, while reflecting higher prices, were slightly below the record made in March of this year, but, with the exception of the total of January, 1917. were far in advance of any other month in the history of the country. A gain of nearly 5 per cent over April is further evidence that the submarine campaign is in no way affecting this movement.

Exports of iron and steel by values during May gained 47 per cent over those of the corresponding month of 1916, but lost 3.5 per cent compared with the record total of March of this year. Shipments of tonnage commodities rose 8.8 per cent over May, 1916, but declined 8.7 per cent compared with the record total of last September. Exports of machinery, though gaining 4.4 per cent over May, 1916, declined 7 per cent as compared with the high water-mark reached last August. Shipments of machine tools, which have been steadily diminishing for several months, fell 34.5 per cent short of those of May, 1916, which was the banner month for exports of metal-working machinery, marking the peak of the demand incident to the fitting up of British and French munitions plants. For the eleven months ended May, the total exports of iron and steel surpassed by 85 per cent those of 1916, which exceeded all previous records by more than 130 per cent. Shipments of tonnage commodities gained 45 per cent, machinery 45 per cent and machine tools 50 per cent over the record totals of 1916.

The value of all shipments of iron and steel products in May, 1917, was \$107,362,635, as compared with

Special A		lav		Months ng May
Imports	1916. Gross Tons	1917. Gross Tons	1916, Gross Tons	1917, Gross Tons
Ferromanganese Ferrosilicon Manganese oxide and ore of Nickel ore and matte. Tungsten bearing ore Exports	74,825 7,865 a	2,019 1,114 81,269 7,024 404	a 4,933 430,620 79,848 a	69,924 7,846 593,310 83,310 3,480
Ferrotungsten and tungsten metal	a 92 1.622	207 139 806	a 436 10,428	719 1,076 13,039

\$72,918,913 for the same month of 1916 and \$111,164,876 for March of this year, when high water-mark was reached. For the eleven months ended May, 1917, the total was \$1,010,496,046, as compared with \$545,018,533 for the same period of 1916, which was an advance of

		-May		Elev	en Mo	nths
	1916	1917		1916		1917
Adding machines	\$138.116	\$205.907		\$956,327		\$1,636,460
Air-compressing machinery		81.247		490,042		1,026,265
Brewers' machinery	7,674	3.853	1	28,620		57.779
Cash registers		70.449		1,314,674		1.284,618
Parts of		2,676		108,768		111.053
Cotton gins	2,059	6.298		61.845		102,209
Cream separators		68.219		456,348		438,563
Elevators and elevator machinery	121.358	189,592		1.367.357		1.960,45
Electric locomotives		25.755		436.863		508.807
Gas engines, stationary	40,798	71.548		331.085		637.192
Gasoline engines		2.416.745		9.731.480		16,303,160
Steam engines		1,410,860		13,265,351		17,222,062
All other engines	590,114	347.683		2,788,230		4.489.453
Parts of	877.648	2,945,271		6,407,301		17,110,182
Laundry machinery, power	29.028	45,435		259.948		313.97
All other		17.667		239,263		282,444
Lawn mowers	21,678	22,325		174,917		163,993
Metal-working machinery (including metal-working tools)	9.935.806	6,515,007		52,849,047		76,348,162
Meters, gas and water	38,636	30.997		258,454		361.334
Milling machinery (flour and grist)	377,523	59,576		2,425,815		1.042.066
Mining machinery, oil well	275.561	189.876		1.183.790		1,742,026
All other	475,373	787.753		5,722,740		9,008,906
Paper-mill machinery	h= 67,632	190,302		821,633	120117	
Printing presses	200,024	149,698		1.441.043		1.690.497
Pumps and pumping machinery	611,438	569.224		4,224,081		5,597,292
Refrigerating and ice-making machinery	97.796	72,152		655,237		790,204
Sewing machines	534,430	682,948		4.995.701		5,730,301
Shoe machinery	66,648	111,472	RE937	1.182,508		1.226.203
Sugar-mill machinery	137,902	366,204		5,589,716		10.316.369
Textile machinery	234,759	290,266		2,336,151		3.194.803
Typesetting machines	218,668	55,345		806,307		1.012,280
Typewriting machines	968,417	818,728		7,990,138		10,100,421
Windmills	86,967	131,341		982,076		844.123
Wood-working machinery, saw mill	34,340	32,640		328,553		424,518
All other	73,723	111,895		1,020,196		913.294
All other machinery and parts of	3,471,329	3,823,524		28,903,231		38,696,782
Total	891 084 081	\$22,960,478		162.135.926	-	234,403,278

70

Imports of		ad Steel	Eleven	Months
	1916, Gross Tons	1917, Gross Tons	1916, Gross Tons	1917. Gross Tons
Ferromanganese Ferrosilicon All other pig iron. Scrap Bar iron Structural iron and steel. Hoop or band iron. Steel billets without alloys. All other steel billets. Steel rails. Sheets and plates. Tin and terne plates. Wire rods.	6,407 909 67	2,019 1,114 1,189 16,372 33 133 24 2,899 717 1,491 44 2	4,933 99,358 92,115 86,646 1,305 11,071 10,678 49,233 1,618 4,126	69,924 7,846 33,997 208,236 4,241 926 12,575 10,473 13,097 1,727 610 2,064
Total	32,113	26,038	362,265	366,740

more than 130 per cent over any previous corresponding eleven months. Exports of machinery in May were valued at \$22,960,478, as compared with \$21,984,961 for the same month of 1916. Shipments of metal-working machinery aggregated \$6,515,007, as against \$9,938,806 for the same month of 1916, when maximum exports were recorded. Exports of machinery of all kinds for the eleven months ended May, 1917, were valued at \$234,403,278, as compared with \$162,135,926 for the corresponding period of 1916, which was an advance of nearly 60 per cent over any preceding 11 months. Details of the exports of machinery for May, 1916 and 1917, and for the two 11 months' periods are given in the accompanying table.

Exports of iron and steel for which quantities are given aggregated 587,900 gross tons in May, 1917, as compared with 540,591 tons in the same month of 1916. The record for exports of these commodities is still held by September, 1916, with a total of 643,763 gross tons, although the shipments of March of this year aggregated 606,560 tons. For the eleven months ended May, 1917, the shipments were 6,253,831 gross tons as compared with 4,334,511 tons for the same period of 1916. An accompanying table shows the exports for May and for the eleven months ended May, 1917, as compared with 1916.

Imports of tonnage iron and steel showed a decline in May, the upward tendency noted in recent months having been sharply checked, due to a falling off in the imports of both ferromanganese and scrap. The total receipts of tonnage iron and steel in May were 26,038 gross tons, as compared with 32,113 tons for the same month of 1916. The imports for the eleven months ended May, 1917, were 366,740 gross tons, as compared with 362,265 in 1916. The accompanying table shows the imports of tonnage commodities for May and for the eleven months ended May, 1917, as compared with 1916.

M. C.

New Company to Make Ferrosilicon

The Southern Ferroalloys Co., Chattanooga, Tenn., has been organized as a Tennessee corporation with a capital stock of \$210,000. Chattanooga and Chicago interests are represented in the company, which has leased, with an option to buy, the plant of the Southern Steel Co., Chattanooga. It is expected that in November the company will begin the manufacture of ferrosilicon for the production of which three electric furnaces are being installed. Power will be obtained from the Tennessee Power Co., which has a hydroelectric plant, and the expectation is that 3000 tons of high-grade ferrosilicon will be produced annually. While present plans call for the making of ferrosilicon only, the manufacture of other ferroalloys later on is contemplated. The officers of the company are: President, Hall J. Kruesi, Chattanooga; chairman of the board, Eugene B. Clark, president, Buchanan Electric Steel Co., Chicago; vice-president, N. Thayer Montague, Chattanooga; secretary and treasurer, Theodore L. Montague, Chattanooga, and general manager, George L. Davison. The last-named is now of Chicago, but will make his home in Chattanooga.

The United Furnace Co., Canton, Ohio, will build a ladle house, 55 x 125 ft. George M. Demarest, Pittsburgh, is engineer.

PIG IRON WARRANTS

George H. Hull Favors Important Extension of Governmental Control

Present conditions in the pig iron market are discussed in a statement which has been issued by George H. Hull, president of the American Pig Iron Storage Warrant Co., New York, who presents what he believes is a satisfactory method of preventing prices from ascending to still higher levels. Mr. Hull says that for the ninth time within the past 80 years business in the United States has been hampered and delayed in consequence of a famine in pig iron. "In times of peace," he says, "these delays have resulted in the loss of millions of dollars to the business of the country; in time of war, they must necessarily prolong its duration and thus add enormously to the loss of human lives. The violence of these pig iron famines can be appreciated by the pronounced effect they have had upon its price during their existence: During the mildest ones, price has advanced more than 100 per cent. During the most violent ones it has gone up from 300 to 400 per cent. Pig iron, which sold at \$9 per ton in Pennsylvania in 1897, is now selling for \$50 per ton. During the Civil War, iron advanced to \$80 per ton. No one can estimate how much more severe the present famine may become, or how much it may weaken our effectiveness in the war, if our Government does not take prompt steps to remedy the evil.

Contrasting conditions of this country with those in Great Britain, Mr. Hull says: "There has existed for more than 70 years a simple and practical system for accumulating reserve stocks of pig iron; and it has for 70 years resulted in that country carrying an average stock equal to six months' production. The average stock carried by the United States in that period has been less than three weeks' production. The measure of benefit enjoyed by the business enterprises of Great Britain, through her intelligent laws and customs in this respect, can be estimated from the fact that during the nine pig iron famines which have occurred within the last 70 years, the average advance in its price has been but 50 per cent, as against an advance of more than 200 per cent in the United States."

Mr. Hull says that efforts have been made to introduce the British system into the United States, but with only partial success for the reason that customs which have grown up in the United States have become too fixed to be changed or overcome by private enterprise. "It is believed now," says Mr. Hull, "that nothing but a great calamity, such as the present war, and Government action can do away with these customs and inaugurate the British system in this country."

Mr. Hull then proceeds to argue that there is no constitutional reason why the United States Government cannot do what is necessary to inaugurate the British system and he believes the war has furnished strong reasons why it should do so. He adds: "For 50 years or more, our Government has acted as warehousemen for the whiskey producers of the country. All that is needed now to make it possible to accumulate an ample supply of pig iron as soon as possible is that the Government should offer to act as warehousemen for the pig iron producers. The service sought from the Government, to accumulate reserve stock of pig iron now, will not be one-tenth as arduous or complicated as the service it has rendered to whiskey producers for the carriage of their product. Whiskey requires for its care, expensive warehouses, fire insurance, constant at-Pig iron can be stored in open yards in tention, etc. full view of the public. It requires no warehouse, no care, no fire insurance, and no attention."

In conclusion Mr. Hull says: "In Great Britain the pig iron warrant system was established and has been maintained by private enterprise. If such a system is now inaugurated and maintained in this country by the Government, its national credit would make it vastly more effective and useful than the British system has been, and in normal times the system would pay the Government a revenue. But that would be the least of its benefits; it will make this country the future store-

house of the world for pig iron. M. Lebon says, 'It is on the coal and iron of the world that the world's peace depends.' The United States could be trusted with this power. . . . To-day we are suffering for everything we need made of iron; comparatively no stock on hand and prices up 300 to 500 per cent. Is it not time for the Government to act, and do for its people what they need, and cannot do for themselves?"

Traveling Crane for Steel Mills

A new line of electric traveling cranes designed for high efficiency to meet the severe requirements of steel mill crane specifications has been brought out by the Champion Crane Co., Cleveland, of which the Biggs-Watterson Co., Guardian Building, Cleveland, is general sales agent. Various refinements have been provided in this crane, rather than any radical changes in the mechanical design. The predominating features claimed for it are its simplicity, safety, accessibility and interchangeability of parts.

The structure is designed to secure the rigidity required to withstand heavy shocks and severe strains. The side frames consist of two heavy steel castings connected by a wide and heavy steel girt or separator. The separator, which carries only the hoisting motor and its electric brake, is fastened to the side frames by large bolts and rests on ledges machined on the side frames so as to relieve the bolts of all shearing strains.

All fastenings are effected by through bolts with U. S. standard nuts, and all bearings are provided with caps and fitted with split phosphor bronze bushings. The bushings are provided with end flanges. The upper half has a lug protruding through a center hole in the cap to prevent rotation. The lug is drilled and tapped to receive compression type grease cups. Shafts in the hoisting mechanism are located in a horizontal plane, permitting any shaft with its pinions and gears or hoisting drum to be lifted out without disturbing any other part. The shafts are of forged steel.

Shaft bearings on the hoist train are interchangeable so that only one size of bushings need be carried for replacement. A new feature in the design of the trolley side frames is that they are arranged to receive not only split bronze bushings for grease lubrication, but also solid bushings with rings for oil lubrication.

Either cast-iron trolley track wheels with chilled ground treads are furnished as the standard or cast-steel wheels can be supplied. The wheels are keyed to axles revolving in MCB type bearings provided with phosphor bronze hexagon bushings and oil cellars of ample capacity.

The lower block is of the side plate design. The hook is of forged steel and swivels on chrome-nickel steel balls. The hook is inserted through a forged

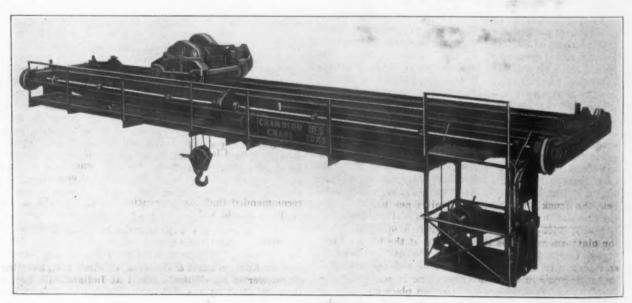


The Movement of the Hook Block Is Relied Upon to Prevent Overwinding by Breaking the Circuit through the Limit Switch

steel cross-head. The sheaves on the lower block have phosphor bronze bushings and any sheave is interchangeable with any other of equal diameter, whether located on the upper or lower blocks.

The upper rope sheaves are carried on an independent structural girt which is attached to the trolley in such a way that it is not rigidly secured to the trolley frame, and it is stated that because of this design excessive deflection, due to an overload or accidental injury, cannot be communicated to the trolley frames or throw the hoist bearing out of line, thus precluding the possibility of binding the machinery. The ends of the structural steel load girt are connected to the trolley frame by pins, about which the ends of the girt are free to rotate under the influence of the deflection. This structural steel girt has no connection with the separator supporting the hoist motor.

All gears are steel with cut teeth and all pinions are cut steel forgings. The gears have wide faces and substantial arms to stand overloads due to the sudden starting, stopping and reversing of the motor. The gears are inclosed in cast oil-tight gear cases with large swinging covers. There are no overhanging gears, all gears being keyed to their shafts and located between two bearings. The gears in the trolley propelling



Refinement of Mechanical Design Rather than Any Radical Changes Characterizes a New Line of Electric Traveling Cranes for Steel Mill Service

mechanism are accessible by removing one-half section of the inclosure.

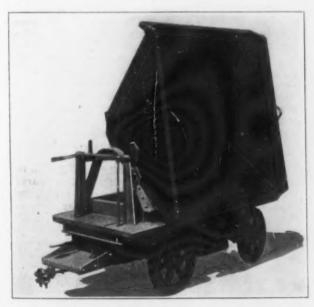
The mechanical load retaining brake used when dynamic breaking is not employed is a modification of the Weston multiple disk type. The working parts are inclosed in a casing and a differential flexible band is provided to grip the brake wheel or case when lowering. The advantage claimed for this type is that it applies itself without undue shock and the operation is positive, smooth and noiseless. The load brake is located between large bearings adjacent to the drum pinion, the outer bearings and retaining device being fastened to a bracket cast integral with the trolley frame.

The trolley is designed for any standard crane hoist motor and motor brake, either alternating current or direct current. The hoist mechanism is provided with an automatic switch, limiting the upper travel of the hook. The limit contact is actuated by the hook block itself. The magnetic switch is normally held in a closed position and is opened whenever the circuit is interrupted. In other words the safety hoist limit operates by "breaking" and not by "making" a circuit. The trolley is designed so that attachments can be made of all standard safety devices and for the attachment of platforms to the sides or ends of the trolley.

Cradle Dump Body Storage Battery Truck

An electric storage battery truck equipped with a cradle dump body has been brought out by the Orenstein-Arthur Koppel Co., Koppel, Pa. It is intended for carrying a load of 3000 lb. in the dump body or can be employed as a tractor for pulling 10,000 lb.

The truck proper is of the builders' standard construction with a frame of steel channel section and a hinged oak platform. Four spiral steel springs sup-



A Load of 3000 Lb. Can Be Carried in the Cradle Dump Body or the Truck Can Be Employed as a Tractor to Haul 10,000 Lb.

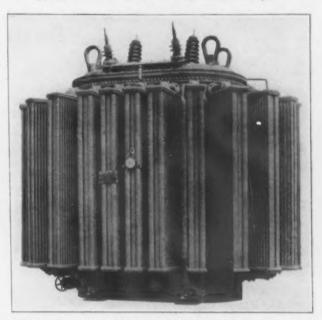
port the frame and are relied upon to protect both the load and the truck from shock. Cast steel wheels, 20 in. in diameter, with 3-in. solid rubber tires and two Timken roller bearings to each wheel, are used. The wheel base is 52 in. and the gage is 34 in. An Ironclad Exide battery supplies power to the motor, which propels the truck at a speed of 7 miles per hr.

The body is of the self-clearing type with a dumping

The body is of the self-clearing type with a dumping angle of 40 deg. A simple mechanism operated from the platform regulates the dumping of the body. Lifting hooks are provided at each end of the body to enable it to be removed and give access to the batteries through a door in the platform. The loosening of the bolts holding the dump body frame in place enable it to be removed and access to the motor jackshaft and brake to be obtained after a section of the hinged platform is thrown back.

A Large Self-Cooled Transformer

Transformers having radiators located around the containing tank have been built for the Carnegie Steel Co. by the General Electric Co., Schenectady, N. Y.



Oll Circulating Automatically through a Set of 24 External Radiators Is Employed to Cool This 8000-Kva. Transformer, Which Is One of Six Furnished to a Large Steel Company

In addition to the use of the radiators, the transformers are interesting as they are said to be the largest ones of the self-cooled type ever constructed. Each transformer is rated at 8000 kva. and is employed for stepping a voltage of 44,000 down to 6600. The order called for six of these transformers and they have been installed on a single-phase, 25-cycle circuit.

The 24 radiators consist of vertical flattened tubes

The 24 radiators consist of vertical flattened tubes rigidly welded into headers which are flanged for bolting to the tanks. The total surface provided approximates 1,000,000 sq. in. and the cooling is obtained by circulating oil automatically through the radiators which are self-draining and have no pockets. This feature of construction is relied upon to prevent the accumulation of air at the top and moisture and sediment at the bottom. All of the seams and the joints in the tank and radiators are welded with a view to preventing oil leakage, and with the same object in view screwed pipe fittings have been done away with between the containing tank and the radiators. The connections between the radiators and the tank are made by cast-iron elbows with machined surfaces and flanges on the tank and the radiator are provided for securing the elbow in place with bolts.

Electrical Engineers' Meeting

The eleventh annual convention of the Association of Iron and Steel Electrical Engineers will be held in the Bellevue-Stratford Hotel, Philadelphia, Pa., Sept. 10 to 14, 1917. Wednesday, Sept. 12, is to be devoted entirely to a patriotic program, with addresses by army and navy engineers on vital subjects concerning industries. A. H. Swartz of the Westinghouse Electric & Mfg. Co., Cleveland, is chairman of the entertainment and convention committee. It was first decided not to hold a convention of the electrical engineers this year on account of the war, but Secretary of War Baker recommended that the convention should be held, as no doubt it would aid in bringing to electrical engineers the great necessity of close co-operation with the Government during the war.

The Kokomo Steel & Wire Co., Kokomo, Ind., has filed its answer in the Federal Court at Indianapolis in the suit against it by the Republic of France. It makes a general denial of the charges of breach of contract and alleges payments were not made as promptly as provided in the contract.

Magnetic Analysis of Steel Products*

Advantages as Applied to Rails—Detection of Defects Not Revealed by Mechanical Tests — Value of the Individual Test

BY DR. CHARLES W. BURROWS

THE fundamental principle that there is an exact correspondence between magnetic and mechanical properties has been established beyond doubt. Considerable headway has been made in the practical

application of this principle.

The present paper may be considered as a further, though partial, report on the same problem. In it are given very briefly some of the actual accomplishments toward the solution of the problem. At the present time laboratory tests are being made upon tools, cutlery, springs, ball bearings, cables, rails and a few other articles. Not only are the laboratory methods capable of being expanded into practical shop or commercial tests, but the actual development along certain lines is in progress.

The science of magnetic analysis consists in the systematic correlation of the magnetic and other properties of materials and of the application of the laws and principles which underlie the interrelations of such properties, particularly the interrelations of the magnetic and mechanical properties of steel. The art of magnetic analysis consists in the determination of the magnetic characteristics, or better, a small number of the magnetic characteristics, and from these observations making estimations of the mechanical properties.

Criteria of Mechanical Properties

The nature of a piece of steel may be studied by observing its behavior under the action of certain mechanical forces. The usual mechanical tests result in the destruction of the specimen so that it is not feasible to give such a test to the identical material to be used in a given structure. Even such superficial and intensely localized tests as the Brinell ball hardness test and the scleroscope test require the finishing of the surface tested, and after their application leave the surface in a modified condition.

The chemical analysis is extremely valuable and is usually considered as being the most valuable criterion of the mechanical possibilities of the steel. This test also must be made on a part of the material which does not enter into the final structure. It is, however, entirely inadequate to tell what condition the steel may have been left in as a result of its previous thermal and mechanical treatment. Two pieces of steel of the same chemical composition may be given different heat treatments and finally have widely different mechanical properties. Microscopic analysis becomes difficult in the fine-grained steels. Here the structures of slightly different heat treatment are so nearly alike that it is possible to make only a rough estimation of the heat treatment from the microscopic observations.

The mechanical, chemical and microscopic analyses of steel form the basis for the customary specifications and testing. They are, however, open to one or more of the following objections:

They are vicarious, destructive, local or qualitative.

Factors Affecting Mechanical Properties

It is well supported by experimental evidence, but not so generally known, that two pieces of steel which differ in certain particulars, likewise show corresponding magnetic differences.

*From a paper presented at the annual meeting, of the American Society for Testing Materials, Atlantic City, N. J., June 27, 1917. The author is with the Bureau of Standards, Washington. At the Budapest Congress of the International Association for Testing Materials in 1901 there was proposed Problem 28, "The consideration of the magnetic and electric properties of materials in connection with their mechanical testing." At the 1912 congress of the same society the author of the present paper presented a report on this problem. This paper pointed the way to a number of possibilities but was little more than a glance into the future.

Magnetically an increase in carbon content is accompanied by an increase in coercive force and hysteresis, and a decrease in permeability. The cold drawing of a carbon steel increases its tensile strength and simultaneously increases its coercive force and hysteresis. Cold drawing also decreases the magnetic permeability.

Magnetically, changes of equal magnitude also occur on quenching. The quenched steel has a greater coercive force, a greater hysteresis, and a lower permeability. In a specific case a one-per-cent carbon steel in the quenched and the annealed conditions had Brinell hardness numerals, in terms of kilograms per 0.1 mm. indention of 4390 and 800 respectively. The corresponding values of the coercive forces for a magnetizing force of 150 gausses were 33 and 12. Steel changes with lapse of time. Both mechanical and magnetic changes occur. Glass-hard steel softens with age. The same steel shows a decrease in coercive force.

The mechanical properties of a bar of steel may differ from point to point if the bar has not received the same treatment throughout. For instance, if a uniform bar is given a slight bend and again straightened it will show a slight change in its mechanical properties. There will be an increase in both hardness and tensile strength. The same bar will show a corresponding decrease in permeability in the same region.

Even during the operation of stressing a bar we feel sure that changes in the mechanical nature are occurring. Less is known about this phase of the problem than the preceding. However, we do know that small alternating stresses, even though well within the elastic limit, leave the material mechanically fatigued and if the stresses are repeated often enough rupture occurs. While it is difficult to study the changes in mechanical properties after repeated or alternating stresses, the magnetic problem is quite simple and has been investigated to some extent.

Defects in Raw Material

Raw material must be uniform in quality. The proper mechanical and thermal treatment must be determined for each steel that is used. It very frequently happens that two steels of quite different composition may give equally good performance for a particular service provided each steel is given the appropriate heat treatment. In general the heat treatments required for the two steels will be different. Consequently if the heat treatment appropriate to the second steel is given to the first, disastrous results may be expected. The requirement that all bars shall be alike in prop-

The requirement that all bars shall be alike in properties implies that each bar shall have the proper composition, shall be properly forged, rolled or drawn, as the case may be, and shall be free from local imperfec-

tions such as blowholes, segregation, etc.

Occasionally a lot of steel of the wrong composition is supplied through error; or, by some chance, a single bar of different composition may get mixed up with the general stock. If not detected such a bar may cause much loss or annoyance. Very frequently a steel, especially among the alloy steels, may have the proper chemical composition but with the elements not in the proper state of solution. It is not uncommon to find that a tool made from a large bar will prove defective while the same bar when forged down to a smaller size will yield perfect tools. Since the cost of labor frequently amounts to more than the cost of material, it is very desirable to separate the good from the defective material before costly labor has been put upon it. Another defect that sometimes is found in cold-drawn material is the tearing apart of some of the crystals beneath the outer surface.

Many of these defects would pass unnoticed in the usual examinations by the chemist, microscopist, or mechanical tester. In such cases as the above a mag-netic examination may be expected to be of service.

Value of Individual Tests

The ideal test of a finished product is one which permits the examination of each individually and does not assume that the characteristics of 99 pieces are identical with those of the hundredth one which hap-pened to be picked out for test. Magnetic analysis is adapted to such individual testing. The individual test not only permits the elimination of defective pieces but also permits the grading of a product which, while satisfactory in general, is not all of the same degree of per-It is a matter of common experience that an occasional tool is found which is quite superior to the average fairly good tool. Any method which will enable one to select such exceptionally good tools cannot fail to be helpful. This process of grading will enable the manufacturer to offer a uniformity of product hitherto unknown and permit him to guarantee such uniformity with surety. It is true that certain tools will have to be sold as seconds at a reduced price. On the other hand there will be a new class of exceptional facturer could have assured himself that his samples were representative of his best product.

I have made laboratory tests on a number of commercial articles with considerable success. mental evidence already at hand shows that it is feasible to apply individual magnetic tests to many forms of tools, cutlery and springs. These tests are of such a nature that they may be carried out on a commercial scale. Rings and balls for ball bearings are now being tried out by this method with every promise of success. Steel rails, in spite of their size, lend themselves very readily to this method of examination.

Magnetic Detection of Service Effects

Since the magnetic and mechanical properties of steel suffer changes with the lapse of time and under ordinary service conditions, the magnetic method offers a very promising means of examining, without destruction, the changes that develop during the life history of a structure. Some of the things to be looked for are the ordinary results of wear and tear. A good example of this is the mine or elevator cable.

A structure may fail by the development of flaws. For instance, a steel rail may render apparently satis-

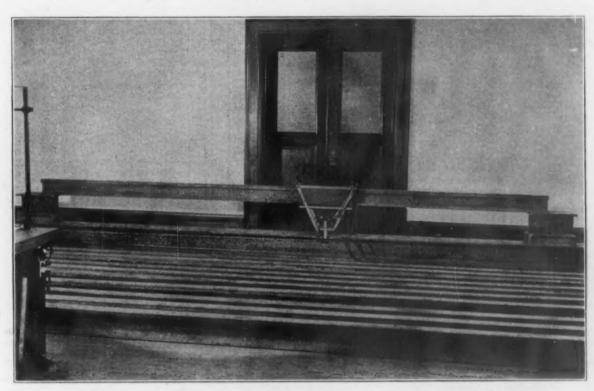


Fig. 1-The Magnetic Circuit of the Rail Under Examination by the Leakage Test

quality which will bring a correspondingly higher

The individual test will permit improvement in de-At present we insist upon factors of safety so large that there would be a reasonable factor of safety even though there were a considerable amount of defective material. If a material is used whose individual properties are not known and which may vary between wide limits a greater factor of safety is used than if known material were used. For example, a cast-iron structure might have a factor of safety of ten while a similar structure of steel would be safe with a factor of

four or five.

Frequently it is desirable to make exhaustive tests upon a few pieces. Such cases arise where one or more samples are submitted in competition with other material. I recently witnessed a test on the results of which an order of \$200,000 was to be based. Five pieces worth about \$2 each were submitted by each competitor. The properties of each sample depended upon proper composition and proper heat treatment. Even though the composition were correct a slight error in the heat treatment would place the material at a disadvantage. By a suitable magnetic test the manufactory service for several years and finally develop a transverse fissure which results in a dangerous acci-dent. Periodic examinations of rails which are under suspicion because of excessive duty or other causes may be made and we may thus detect the presence of such

a flaw in an early stage of its development.

Magnetic analysis may be of use in the development of a new design. It is customary when a new design or a new model is developed to run a service test and at intervals to dismantle the apparatus and go over in detail the various members of the structure. This procedure is common in high-grade mechanisms such as automobiles, adding machines, etc. Such an examination will detect errors in design or faulty material which result in fracture or excessive wear.

Another field which has not as yet been tried, but for which the possibility has already been established, is in the study of the state of stress of a given structural member. The fact that steel suffers certain changes in its magnetic properties when put under tension and certain other changes when put under compression renders such a determination possible.

The apparatus required and the procedure of testing depends to a great extent upon the nature and size of the material tested as well as upon the characteristic flaws to be expected. Apparatus for examining safety-razor blades is necessarily quite different, notably in size, from apparatus for the testing of steel rails. In the case of a lathe tool in which only the nose is hardened the examination differs from that of a locomotive driving rod which is more nearly uniform throughout.

Magnetic Testing of Rails

If the testing of rails is to give a certainty of the quality of the material, it is necessary to test not only each rail, but every element of the length of each rail. This may be accomplished by a double magnetic test. One part of the magnetic test will determine whether there are non-uniformities along the length of the rail. Since this test is based upon a determination of magnetic leakage it is referred to as the "leakage" test. The leakage test determines the homogeneity of the rail.

Inhomogeneities, while they may not be due to dangerous imperfections, always cast suspicion upon the rail. Inhomogeneous rails should not be used in places where the highest degree of perfection is required. For instance, inhomogeneous rails should not be used on bridges, in tunnels, or where the traffic is heavy. Homogeneity in itself is not evidence of perfection. A rail may be quite uniform along its length and yet be an unsafe rail. Its dangerous nature may be due to improper chemical composition or to errors in the process of manufacture such as improper finishing temperatures or excessive cooling rates. To determine whether or not such defects exist requires a determination of one or more magnetic constants. The measurements may be made in some form of permeameter and in conformity with the nomenclature for similar tests on small specimens, we call this part of the magnetic examination the "induction" test.

Figs. 1 and 2 show the general appearance of the leakage apparatus for rails. A magnetizing solenoid is moved along the length of the rail. Any non-uniformity along the rail will cause a variation in magnetic leakage. This variation in leakage develops a small electromotive force which is approximately proportional to the degree and sharpness of the non-uniformity. A special recording voltmeter, not shown on the photograph, makes a photographic record of the magnetic inhomogeneities. This examination of a rail can be made in about one minute and excessive demands for skill and training are not made upon the operator.

Fig. 3 shows a set of magnetic-leakage records of a 105-lb, rail before and after gagging. This rail has the following chemical composition:

																						P	er Cent
Carbon		į.					h	k			á	×		×	ů,	ž	i.						0.68
Manganes	6															,							0.98
Phosphoru	18		,			ļ.		þ							4			×					0.025
Sulfur																							
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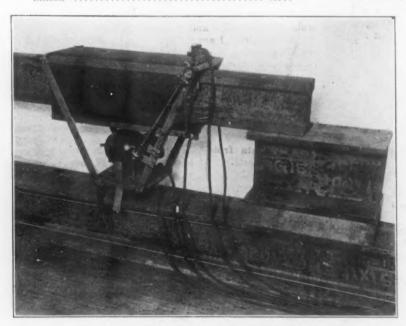


Fig. 2-The Traveling Solenoid Used in the Leakage Test of Rails

It is one of a set of rails which was expressly prepared for this investigation. The rails as they left the hot bed were practically straight and therefore did not need to go through the gag press.

The middle record shows the normal record of a rail free from inhomogeneity. The irregularity in the curve at the right-hand end is due to the starting of



Fig. 3—Leakage Curves of a Rail Before and After Gagging. Vertical Arrows Indicate Position of Application of the Gag. Horizontal Arrows Indicate the Distance Between the Supports

the apparatus and therefore has no significance. From these curves several observations may be made.

The rail before gagging shows a magnetic-leakage curve which is substantially a straight line.

Pressure applied locally so as to deform the metal produces a magnetic inhomogeneity at the point where the pressure is applied. This is true whether the pressure is applied on the head or on the base.

The extent of this local inhomogeneity depends upon the distance between supports. If the supports are far apart the strain seems to extend over the entire cross-section and seems to be greater on the side of the rail opposite the point of application. If the supports are close together the strains are localized on the side on which the pressure is applied.

The strains set up by the supports depend upon the distance apart of the supports. If the supports are 90 cm. apart the magnetic effect of the supports is insignificant. If they are only 45 cm. apart this effect is considerable. In fact, the side of the rail on which the supports lie shows a magnetic inhomogeneity at each support which is greater than the corresponding inhomogeneity opposite the gag.

Other observations on other rails show that the degree of magnetic inhomogeneity increases with the load applied by

Furthermore it is worthy of note that another rail from the same ingot which had been annealed showed a much less effect for the same gagging stress.

This ability of the magnetic leakage test to indicate the effect of gagging is of importance in view of the fact that many people consider that excessive gagging produces minute failures in the rail which are in effect potential transverse fissures.

The induction test is fairly simple. Fig. 4 shows the

test rail and magnetizing solenoids in position. The accessory apparatus, similar to that required in induction measurements of small rods, is not shown. The most useful magnetic quantity is probably the coercive force. For the purpose of illustration we may give the coercive forces of two lots of rails of substantially the same chemical composition, made at the same mill, and differing only in their method of cooling. Four rails rolled in winter were from the first ingot which passed through the mill in starting the round for that particular date. Consequently these rails were the first upon the hot bed which was initially cold. Two other rails of substantially the same chemical composition were selected from a full hot bed and from the middle of a round rolled when the atmospheric temperature was 70 deg. Fahr. The averages of the coercive forces for a magnetizing force of 145 gausses were 10.30 gausses for the winter rails and 8.91 gausses for the summer rails. This difference of 1.39 is probably due in great part to the difference in the rate of cooling of the two sets of rails.

Commercial Magnetic Analysis

The fundamental fact that there is a definite relation between the magnetic and mechanical properties of steel is so well established that the successful application of magnetic analysis to commercial testing is assured. In any particular case the apparatus must be developed and operators trained. However, the difficulties presented are not excessive. Before shop methods of examination of any given product can be installed, a preliminary investigation must be carried out which involves five steps.

Magnetic data of representative material must be determined. Good, bad and indifferent materials must be examined and the data thus obtained correlated so that one may know what magnetic characteristics go with each grade

of material.

From the mass of data thus obtained the most suitable magnetic criteria must be determined. In some cases any one of several magnetic constants may be equally satisfactory. In other cases only one specific constant may be used. Still others may require the combination of two or more magnetic constants.

Suitable apparatus must be designed. After the proper criteria have been determined the next step is to determine what type of apparatus is best suited for the particular material to be tested.

Limits of quality must be determined. Since the proper combination of speed, cost and accuracy may call for some slight deviation from the ideal theoretical considerations, the material to be tested must be examined by the final form of at paratus. From these data the final criteria of quality must be determined.

The final step of this preliminary investigation is the reduction of all the operations to mere routine, so that shop determinations may be made by an observer who is not necessarily an investigator.

It is not feasible to make an estimate of the cost of the testing equiment. However, it would not be excessive. The rail-testing apparatus shown could be duplicated for about \$1,500. While this apparatus would undoubtedly require modification for shop practice, this amount may be considered as a rough estimate of the cost.

Discussion .

Dr. J. S. Unger, manager central research bureau, Carnegie Steel Co., in discussing the paper, said:

Magnetic testing to a certain extent permits of testing every piece if of some length, such as a rail or drill, but short, heavy objects, such as castings, are difficult if not impossible to test. The apparent advantage of testing every rail is not hew, as every rail is, and always has been tested automatically during the process of straightening. It has been shown that magnetic and mechanical properties bear a relation to one another. This same statement may be made of the chemical composition or heat treatment when compared with the mechanical properties.

Magnetic testing will show a pipe if of considerable extent. As there are almost diametrically opposite opinions among railroad authorities as to whether a pipe is injurious in a rail, must this not be settled first?

The effects of cold rolling or drawing, torn surfaces or interior defects produced by cold work may be shown. A rail in service is cold rolled on the head, which is an essential part of the service it performs. A locomotive standing on a track will stress the rail under each wheel. Such stresses can be magnetically shown. If the locomotive be moved or the tie supports changed, the stresses change to new points. Magnetic disturbances are shown at each tie in Scientific Paper 272 of the U. S. Bureau of Standards.

It is claimed a rail may be magnetically homogeneous, but unfit for service, due to improper chemical composition, finishing temperature or excessive

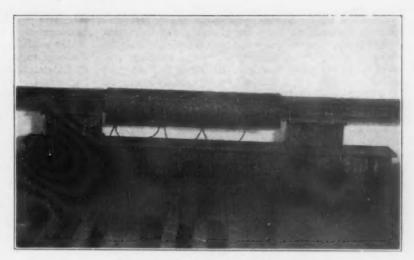


Fig. 4-A Simple Type of Rail Permeater

cooling rates. Rails are not made of either very soft or very hard steels, but within reasonably close chemical requirements, yet some rails do fail. If rail finishing temperatures considerably above and below the limits prevailing at different mills affect the quality, why does the actual experimental evidence from the track not prove it? Winter and summer rails are shown with different magnetic properties attributed to dif-ferent rates of cooling. The inference is, that the more rapidly cooled rails are inferior. If this be true, why are some railroads considering plant installations to heat and artificially cool rails more rapidly, and how can we explain a difference of 50 per cent less wear in oil-quenched rails after five years' service when compared with a similar number of untreated rails under exactly the same conditions of service, no failures occurring in either?

If a gagged rail shows a magnetic disturbance where gagged and an annealed rail a lesser effect, should rails not be ordered annealed or, what accomplishes the same purpose, of a softer variety chemically? If such be done will the rails not require more frequent renewals on account of wear? Referring again to the gagging, no truly comparative track evidence has been presented, so far as I know, to prove that it is injurious. I have not been able to prove it from gagged and ungagged rail experiments made in the track.

It is recommended that magnetically inhomogeneous rails should not be used on bridges. The data on rail failures do not indicate that rails fail at this point, probably due to their better support. If rails are inhomogeneous, would it not be better to discard all such rails, or if they must be used to install them at such points where failures rarely occur?

Reference is made to the detection of flaws such as transverse fissures and to the periodic examination of rails in service. I am interested in knowing if a fissure has been detected in an apparently sound rail, and if such can be detected after such a rail is laid, or does it only appear after being in service for some time.

Within three years at least five methods have been suggested for testing rails. The question arises, have these tests where used positively shown the fitness or unfitness of a rail for actual service? Is there not a greater need for the correlation of the present tests with the data from actual service than for any new method of testing? I believe a study of the conditions existing in the track is of equal importance with a study of the rail.

Comments by Professor Howe and Dr. Burrows

Dr. Henry M. Howe termed the paper a step forward in a very important direction. Described in a word it measures, he said, the reaction of a form of energy which has no permanent effect on the material. He suggested that we must not expect immediately great practical use of the method, but he does believe that there will be radically new methods of testing, though present methods may not give way in the present generation.

Dr. Burrows, in his elaboration of the paper, emphasized the coercive force as probably the most important feature of the magnetic method, particularly in analyzing heat-treated specimens. A given steel annealed may have a coercive force (the force necessary to neutralize residual magnetism) of 10, but this may be about 30 or 40 after the specimen is quenched. He finds the coercive force will indicate differences in quenching temperatures as close as are measurable by means of the pyrometer. With rails it has not been found feasible as yet to apply coercive force, but instead to depend on variations in permeability. He has found it possible to investigate articles in length shorter than the diam-

eter, and has secured results in investigating balls for bearings.

He explained that magnetic tests have not yet been made of rails in place, though he did not regard such an investigation as impossible, particularly as there is no necessity that in the investigation the rail should be encircled. Investigations were in progress to test elevator cables by carrying the apparatus near by. He explained an interesting case of how he applied the magnetic test to a large number of bars to locate one which he knew some years before had been cut in the middle but joined together with ground surfaces so that the joint could not be detected visually.

Rapid Growth of Shipbuilding Plants

Large Additions to Works of Standard Corporation— Improvements on Staten Island—Large New Plant of Baltimore Company—Plans for Wooden Ships

Nineteen shipbuilding concerns, with a total authorized capital stock of about \$75,000,000, received charters during June, marking the climax of shipbuilding expansion which, since Jan. 1, has resulted in the formation of companies having an aggregate capitalization of more than \$150,000,000. Three of the largest companies incorporated during the past month have a combined capital of \$60,000,000. They are the Great Eastern Shipbuilding & Drydock Co., \$30,000,000; the Merchant Shipbuilding Corporation, \$20,000,000, and the Seabury Engine & Shipbuilding Co., \$10,000,000. During the first six months of 1917, ten companies have been chartered with capitalization of more than \$5,000,000 each.

This striking shipbuilding expansion is as yet largely on paper, however. Many of the concerns decline to divulge their plans, but are said to have been organized with the expectation of receiving Government contracts, which have not as yet materialized. Actual shipbuilding activity is so far largely confined to those plants which were in operation before the United States inaugurated its shipbuilding program, although other yards are being equipped as rapidly as present conditions will permit.

The shipyards in the vicinity of New York, which have been affected by strikes of workmen during the past week are largely engaged in repair work for the Government, principally on the German liners, which were seized upon the outbreak of hostilities. It is reported that the Government may take over some of these yards, if the strike situation is not speedily settled.

Important Shipyard Extensions

The Standard Shipbuilding Gorporation, with office at 44 Whitehall Street, New York, is completing large additions to its plant on Shooter's Island, in lower New York Bay. This property, comprising 53 acres, was acquired last September. A new boiler shop and plate shed, 240 x 400 ft., has been completed; an extension of the machine shop, 84 ft. 6 in. x 282 ft., and an extension of the blacksmith shop, 66 x 120 ft. have likewise been finished. These buildings are of steel construction. A large quantity of equipment is now being installed. Six new shipways of steel, each 450 ft. long, and 14 derrick towers of steel have also been built, each tower having four 5-ton electrically operated derricks. Forty-eight derricks were furnished by the American Hoist & Derrick Co. A new pier has also been built and considerable money has been expended in dredging and filling in low land. A total of \$3,000,-000 has been expended for shops, equipment and incidental work. Six ships are now under construction, one having been launched on May 29, and another will leave the ways soon. These ships are of standard design, being of steel, 392 ft. over all, and of 7300 gross tons dead weight. They are being built on private con-

tracts, but presumably will be taken over eventually by the Government.

The Staten Island Shipbuilding Co. is making important improvements at its Staten Island yards. A plate shed, one story, 100 x 150 ft., has been completed and the following buildings are under construction: A mold loft, joiner shop and saw mill, two stories 83 x 225 ft.; a bending shed, one story, 75 x 200 ft.; a power house, one story, 45 x 80 ft., and an extension, to the foundry, 100 x 100 ft. These buildings are of steel. They will be completed about Sept. 1. Two shipways to accommodate 450-ft. ships will be erected soon and two more berths for 200-ft. ships. The company is receiving bids on material for the construction of a boiler shop, 60 x 250 ft., and a machine shop, 110 x 250 ft., with three galleries, and a blacksmith shop. Several traveling cranes will be required for the proposed boiler shop. The Staten Island Shipbuilding Co. is doing considerable private work and also has received a Government contract for four ships.

The Downey Shipbuilding Corporation, 120 Broadway, New York, is going ahead with plans for building steel ships on Staten Island. This concern recently acquired the plant of Milliken Bros., Inc., at Milliken, S. I., which includes a fabricating shop. Definite plans of this company will be announced soon by Wallace Downey, the president.

The Submarine Boat Corporation, 11 Pine Street, is maintaining silence regarding its reported plans for the building of a steel shipyard on Newark Bay. This project has been talked about for some weeks. In co-operation with the Lackawanna Bridge Co., the Submarine Boat Corporation is said to be making plans to launch a steel ship every day after the first one leaves the ways

The Samuel L. Moore & Sons Corporation, whose plant is at Elizabeth, N. J., is building three steel ships and is doing considerable fitting-up work for the Bethlehem Steel Corporation.

Equipment has been bought for the new shipyard of the New Jersey Shipbuilding Co. at Gloucester, N. J., and the work of construction is being rushed with all possible speed. The company expects to have its first shipways completed by Nov. 1. The New Jersey Shipbuilding Co. is closely connected with the Pennsylvania Shipbuilding Co. of Philadelphia, as both the president and secretary-treasurer of the New Jersey Shipbuilding Co. are officers of the Pennsylvania company and the business is conducted under virtually the same management.

The Newburgh Shipyards, Inc., which has taken over a yacht-building plant at Newburgh, N. Y., has purchased adjoining property and is considerably expanding the yards in anticipation of building steel ships for the Emergency Fleet Corporation. Thomas F. Desmond, a consulting engineer, is president of the corporation, E. C. Bennett is vice-president and general man-

ger and T. W. D. Massiah is purchasing agent. A plate op, 100 x 200 ft., a mold shop, 60 x 200 ft. and four shipways, each to accommodate a 400-ft. ship, are being built. A joiner shop, pattern shop, power house and her shipyard shops will also be constructed. The oncern will purchase a considerable number of mahine tools, three locomotive cranes and overhead ranes. It is hoped to lay the first keel by Sept. 1.

Big Expansion of Baltimore Shipyard

Work on the construction of the very large new plant of the Baltimore Dry Docks & Ship Building Co., which will be located on the old McLean property at Fort McHenry, Md., and will cost in the neighborhood of \$3,000,000, exclusive of the land, is now under way. Contracts for the addition have practically all been closed. The largest, for the erection of steel buildings, was awarded to the Belmont Iron Works, Philadelphia, and amounts to approximately \$500,000. The shipyard tools were contracted for with the Hilles & Jones Co., Wilmington, Del.; the Cleveland Punch and Shear Works Co., Cleveland; Manning, Maxwell & Moore, Philadelphia, and the Niles-Bement-Pond Co., New York. Other contracts were awarded as follows: transformers, rotary converters and switchboard, Westing-house Electric & Mfg. Co., Pittsburgh; motors, General Electric Co., Schenectady, N. Y.; air compressors, Ingersoll-Rand Co., Philadelphia; two locomotive cranes, Industrial Works, Bay City, Mich.; two locomotive cranes, Ohio Locomotive Crane Co.; accumulator and hydraulic pump, R. D. Wood & Co., Philadelphia; wood working and boiler shop tools, R. D. Wood & Co.; machine shop tools, Manning, Maxwell & Moore, and Niles-Bement-Pond Co.; bridge cranes, Manning, Maxwell & Moore; shipyard cranes and 70-ton fitting-out crane, Edward F. Terry Mfg. Co., New York. Day & Zimmerman, Philadelphia, are the engineers.

Otto G. Simonson of Baltimore, is architect for the office buildings, plans for which will be completed within a day or two, and bids for the work will be asked within the next few days.

The improvement plans of the company provide for the erection of the following large buildings: Boiler shop, 110 x 340 ft.; outfitting shop, 70 x 400 ft.; ship shop, 260 x 340 ft.; layout shop, 80 x 360 ft.; mold loft over layout shop, 80 x 360 ft.; fabricating shop, 100 x 400 ft.; assembly shop, 80 x 400 ft.; store building, 50 x 200 ft. The office buildings, which will be three story, will be 50 x 150 ft. There will be four shipbuilding

These improvements were necessitated by millions of dollars' worth of new business, including much work for the Government, which the company has received. At its upper plant, the company will construct for the Navy Department three mine planters. These will be approximately 180 ft. long, with 35 ft. beam, and will have a speed of 14 knots. Only the hulls of the planters will, however, be constructed by the company, as the Government will install the boilers and other equipment after the hulls are completed. In addition to this, the United States Shipping Board Emergency Fleet Corporation has just closed a contract with the company for the construction of eight 8800-ton cargo ships, at approximately \$11,000,000. These vessels will be constructed at the lower plant. They will be of the following dimensions: Length over all, 423 ft. 9 in.; length below poop, 410 ft.; beam, molded, 54 ft.; depth, molded, 29 ft. 9 in.; draft designed load, 24 ft. 2 in.; speed, loaded, 10% knots. Ten ships to be constructed at these yards will be commandeered by the Government. The new plant is expected to be in full operation by Dec. 1. Output of both plants will be 18 large and three small ships annually.

Plans Now for 375 Wooden Ships

The wooden ship program is making progress. is now understood that the Shipping Board has modified its original plans for 1000 wooden ships and instead will build 375. Specifications have been issued and bids asked for material for this number of ships.

The Foundation Co., Woolworth Building, New York, has completed 10 ways for wooden ships at its yard on the Passaic River, and expects to lay the first

keel about Aug. 1. Several small buildings have been erected on the property. A considerable part of the yard equipment has been bought. The Shipping Board has authorized the company to ask for bids on bolts, tie rods, clinch rings, strapping rivets, stem bar, turn buckles, spikes, etc., of which about 150 tons will be required for each ship. These will be bought in the open market, and it is understood there will be no attempt at The company will also buy its forgings in price-fixing. the open market. Ten wooden hulls are to be built, the first to be delivered to the Emergency Fleet Corporation by March, 1918.

Sanderson & Porter, 52 William Street, New York, are equipping their shipyard and also expect to lay the first keel about Aug. 1. They will build 10 wooden hulls, the first to be delivered by April, 1918.

The Traylor Shipbuilding Corporation, whose plant is a Cornwells, six miles south of Bristol, Pa., is building 10 shipways, a few of which have been completed, and the first keel will be laid within 30 days. wooden ships will be built. The machinery for these ships will be built by the Traylor Engineering & Mfg. Co., Allentown, Pa.

The Tebo Yacht Basin Co., Brooklyn, is preparing its yard for the building of submarine chasers for the

United States Navy.

Changes in Boiler Plate Specifications

WASHINGTON, July 10-As the result of an investigation by the Bureau of Standards of the requirements of the Steamboat Inspection Service for steel boiler plate, the interesting fact has been developed that the specifications heretofore in force have been unnecessarily severe and may be safely relaxed so as to increase the output without in any way lessening the safety of this material. Following the bureau's report the executive committee of the Board of Supervising Inspectors of the Steamboat Inspection Service, at a meeting recently held here, has adopted a series of amendments in the general rules and regulations.

One of the most important changes recommended by the Bureau of Standards is the raising of the sulphur limit in open-hearth steel from 0.04 to 0.05 per cent. No change is made in the phosphorus, the amended

rule reading as follows:

Open-hearth steel shall contain not more than 0.04 per cent of phosphorus nor more than 0.05 per cent of sulphur

The bureau also recommended the adoption of a new rule relating to tensile-test specimens and quenchbend specimens which has been adopted, as follows:

Two tension tests and one quench-bend test shall be made from each plate as first rolled from the billet, slab, or ingot, the tensile-test specimens to be taken from the diagonal cor-ners of the plate, and the quench-bend specimen to be taken from that part of the plate which represents the top of the billet, slab, or ingot.

The quench-bend specimen shall withstand, without fracture, being bent over until the ends are parallel and the inner radius equal to one and one-half times the thickness of the

test specimen.

Section 18, Rule II, all classes, of the general rules and regulations, has been stricken out and a modified rule for determining the working pressure on flat sur-

faces of boilers has been adopted.

All of the amendments agreed upon by the Board of Supervising Inspectors will be embodied in detail in a circular letter entitled "Sixth Supplement to General Rules and Regulations" which will be issued within a few days by the Steamboat Inspection Service to boiler manufacturers, manufacturers of boiler plate, steamboat companies and others. The circular may be obtained on application to United States local inspectors of the Steamboat Inspection Service.

The New Departure Mfg. Co., Bristol, Conn., given a bonus of an extra week's wage to all employees who have been in the service of the company over three months and a halfweek's wage to all employees who have been in the service for more than one month and less than three.

Roll Scale in the Bessemer Process*

Better Steel, Increased Output and Lower Cost Some of the Benefits from Its Use— Advantages and Disadvantages Compared

BY A. PATTON AND F. N. SPELLER-

THE use of roll scale in the Bessemer process dates back, to the best of our knowledge, at least twenty years. It was first used by the Ohio Steel Co., Youngstown, Ohio (now the Chio Works of the Carnegie Steel Co.), under the direction of Sam McDonald, superintendent of the Bessemer department at these works. Two 10-ton vessels and one blowing engine capable of blowing one heat at a time were employed. The object of using the scale was to shorten the length of the blow, or in other words, to increase the production with the same equipment.

Various means were tried out for introducing the roll scale into the bath of molten iron: It was shoveled into the vessel before the heat was charged, so that the metal would flow over the scale; it was shoveled into the bath after the vessel was turned up; it was dumped into the empty iron ladle by the wheelbarrow load, and at times was dumped on top of the molten metal in the iron ladle. But the practice of introducing the scale into the iron ladle had to be abandoned on account of danger from explosions and of skulling the ladles.

It was soon learned that the proper place to charge the scale was in the empty vessel, so that when the molten iron was poured into the vessel it flowed over the scale, causing a considerable reaction to take place before the heat was turned up. Eventually, cylindrical chutes similar to those now in use were installed. Into these chutes the scale is dumped and carried into the empty vessel. Before this convenient means of introducing the scale was adopted, the Ohio Works had satisfactorily demonstrated that roll scale would increase production, by blowing 107 heats in one 12-hr. turn (1087 tons) with one blowing engine, blowing one heat at a time; whereas, prior to the use of scale, the best practice at these works was about eighty heats under the same conditions.

In using roll scale and other oxides of iron to facilitate and control the refining of pig iron in the converter, the Bessemer plant has borrowed one of the most active agencies used in the open-hearth process with, as would be expected, much the same results. The effect of such additions to the Bessemer charge may be discussed as to the influence of this practice on quality, production and cost.

Experience has shown that the judicious use of roll scale in the Bessemer operation will not only increase production and reduce cost, but that at the same time it will improve the general quality of the steel. Most of the data on which these conclusions are based were obtained at the Bessemer plant of The National Works, National Tube Co., McKeesport, Pa., with the assistance of George Hitchins. superintendent of steel works, and others of this company.

Influence on Quality

With special reference to the manufacture of soft, weldable steel for pipe, it can be assumed to start with that the most important element in this problem is uniformity of operation. A higher standard of uniformity, especially in those points which affect the welding quality of the steel, is demanded in the manufacture of steel skelp than for other products, and it is probably true that this is generally obtained under modern conditions. Prominent among the factors contributing

to this success is the use of roll scale in the converter.

The influence of this practice on quality is primarily due to the wider latitude in silicon which is thereby given to the blast-furnace operations, resulting in higher average silicon and lower sulphur. To obtain uniformly low-sulphur metal from the blast furnace, the Bessemer department must be designed and operated so as to be able to use without complaint iron that will run from 1 to 3 per cent in silicon. This gives the blast-furnace management a larger margin of safety, thus making unnecessary sudden changes to prevent making iron too hot or too cold for the Bessemer plant. At the steel plant of the National Works, the average sulphur in the steel for 1915 was 0.038 per cent with 95 per cent under 0.050 per cent, the blast-furnace iron averaged for that year 1.77 per cent silicon.

The proper use of roll scale, pig and steel scrap enables the blower to turn down his heats nearer to the same point in carbon by giving a sharper contrast on the final changes in the flame. This makes the loss in manganese and the residual manganese in the steel more constant. It also enables all heats to be blown more nearly in the same time and to the same temperature, which, of course, is favorable to uniformity in heating and rolling and makes all dependent operations more systematic.

The introduction of roll scale provides oxide of iron which would otherwise have to be formed by burning about 1¼ per cent of the metallic charge. A larger amount of oxide added is reduced by silicon in the bath. Somewhat higher silicon must therefore be present when roll scale is used to make up the thermal deficiency.

Production and Cost

In the design of a Bessemer plant, about all the engineer can do with regard to production is to make the vessels sufficiently large to blow the size of heat desired, with a bottom having sufficient blast area to blow the heat in a given time. He would probably use in his calculations a pig iron with 1 to 1.25 per cent silicon. If the blast area was figured sufficiently large to blow iron containing 2 to 2.50 per cent silicon in the same length of time, the operator would be in trouble when required to blow iron carrying in the neighbor-hood of 1 per cent silicon. The vessels would slop badly, increasing the loss, and the quality of the steel would deteriorate. A vessel properly designed, with a bottom having sufficient blast area, using 20 to 25 lb. per sq. in. (1.4 to 1.7 atmospheres) blast pressure and designed to blow a heat of 1 per cent silicon iron with pig scrap in 10 min., will blow a heat of 1.25 per cent silicon iron in the same time if steel scrap is used. When the silicon rises above 1.25 per cent, roll scale and pig scrap can be used, increasing the scale as the silicon rises and so continuing to blow heats in approximately 10 min. When the iron runs above 2 per cent silicon, it may be advisable to use steel scrap and roll scale, although the proportions required cannot be laid down according to rule, but must be varied by the operator, depending on mill conditions.

By this procedure heats can be blown in 10 minwhich would otherwise require 18 min.; thus the full capacity of the plant can be maintained regardless of variations in the pig iron.

The Bessemer department of the National Works has three vessels 8 ft. (2.4 m.) in diameter of 9 tons capacity; the bottoms have 18 tuyères, each having seven holes ½ in. (1.3 cm.) in diameter, giving a blast

^{*}From a paper presented at the annual 1917 meeting of the American Iron and Steel Institute in New York. Mr. Patton is superintendent steel works, Jones & Laughlin Steel Co. (superintendent of National Tube Co. steel works for 10 years prior to Nov. 1. 1916), and Mr. Speller is metallurgical engineer, National Tube Co.

area of 24.7 sq. in. (159 sq. cm.). Using 20 to 25 lb. 1.4 to 1.7 atmospheres) blast pressure, heats of metal with silicon in the charge ranging from 1 to 2.50 per cent can be blown in 10 to 12 min. As most of these heats carry over 1.40 per cent silicon, roll scale and pig metal are nearly always used for "scrapping," the roll scale occasionally running as high as 6 per cent.

scale occasionally running as high as 6 per cent.

Steel scrap is not used with roll scale as a rule unless it is desirable to blow the heats more quickly, and this usually becomes necessary only when the silicon in iron rises above 2.50 per cent. The production of this plant has been increased at least 20 per cent by the use of roll scale in this way.

To analyze the comparative cost of the practice we have been discussing is naturally a very complicated matter. Some Bessemer superintendents claim that it takes 2 tons of roll scale to make a ton of steel. This estimate seems to us excessively high, but even if such were the case we have in this practice a direct method of producing steel far below the cost of any known process.

In order to determine the influence of roll scale by itself, we made several experiments in November, 1916, by running five heats with and without scale at the same time in this plant, all other conditions being maintained constant as nearly as possible. The results of these tests are given in Table 1. The difference in time of blow is the most striking feature. This is entirely accounted for in the shortening of the silicon blow. For example, we give the following records from heats which were carefully watched in this respect, from the last series in Table 1:

W	ithout Roll S	Scale	_	With Roll Se	ale
Heat No.	To First Carbon Flame, Minutes	Finish of Blow, Minutes 141/4	Heat No.	To First Carbon Flame, Minutes 21/2 31/4	Finish of Blow, Minutes
5	7 %	15	5	3 74	101/4

The quicker removal of silicon is apparently due to the large excess of oxygen supplied by the roll scale, and to the oxide of iron which remains in the bath available for combination with the silica. Silica is thus removed from the bath as fast as it forms and we have a good slag from the time the vessel is turned up. The rapid reduction of the magnetic oxide is clearly indicated by the chilling effect on the heat, which is equal to about one and one-half times that produced by the same weight of pig iron.

To determine whether a larger percentage of iron was carried away in the slags under certain conditions, samples of mixer metal and slag were taken for analysis throughout the month of November, 1916. These slags were fairly uniform. At least, the combined iron in the slags did not vary with the silicon in the charge, as would be expected if the variable amount of roll scale added had any material influence on the slag. As the converter slags were as a rule observed to have the same physical consistency as well as practically the same analyses under this practice, it may be assumed that the free iron or shot carried away in the converter slag is also proportional to the weight of slag produced, which varies with the silicon in the charge.

During the month of November, 1916, when the experiments referred to in Table 3 were made, we weighed all the converter slag that was shipped from the mill, and weighed or estimated the loss in the lining and bottoms of the converters. With these data and the analyses of the slags and the charge throughout the month, we have computed the loss in metal in the slag as follows:

Converter Slags

Weight of slag calculated from silica contents per charge of

as,199 100.		SiO ₂ , Lb.
100 lb. from bottom × 80 per cent	=	80.0
50 lb. from sides* × 97 per cent	=	48.5
		128.5
1.74 per cent Si in charge = $0.0174 \times 22,400 \times 60_{28}$		835.2
Total SiO ₂ in charge	=	963.7

Estimated by measuring vessel before and after 500 heats.
 Slags carry 60 per cent SiO₂ (averaged from analyses of samples after removing shot).

Silicates in slag
$$=$$
 $\frac{963.7}{0.60} = 1,606$ lb.

Slag per heat, as weighed for month $=$ 2,016 lb. ($=$ 9 per cent of charge).

Theoretical weight of slag from SiO₂ in silicates $=$ 1,606 lb.

Shot and scrap $=$ 410 lb. or 20.3 per cent. of slag

Combined iron in silicates $=$ 16 per cent \times 1,606 $=$ 256 lb. $=$ 12.7 per cent of slag.

= 33.0 per cent.

The silicon in the charge for the group of heats included in the test heats referred to in Table 3 was practically the same as the average for the entire month. The actual converter and cupola loss for this month amounts to 9.05 per cent, which is somewhat above the average, due to an unusually high percentage of shot in the slag and to the fact that the average silicon for this month was comparatively high. The converter and cupola losses for this month and for the same month in 1915 have been analyzed and are given in the original paper. The actual loss in November, 1915, was 8.45 per cent.

Total iron in slag

The use of roll scale was started at the National Works in December, 1906. For that year the silicon in the charge averaged 1.29 per cent. Assuming all other conditions to be unchanged, the increase in converter loss due to raising the silicon in the charge to 1.61 per cent, as was the case in 1915, would be about 0.3 per cent, based on the slag carrying 24 per cent iron in each case.

There is probably a little more loss due to the greater activity of the reactions in the converter when using dirty or moist roll scale, but this is recovered for the most part and is credited to the steel works. The free iron now lost in the converter slag might also be recovered to advantage so that the necessary excess loss by this practice would consist of only a little more

Table 1.—Results of Experimental Heats With and Without Roll Scale

		ANALY	IRON	Міхив	WE	IGHT OF	CHARGE	in Pot	INDS	Per	Blast Press.	Time		A	NALYSES	OF SLAC	is	
	Exper. Run No.	Total		-	Mixer	Pig		Roll	Total	Cent Si in Charge	Pounds per Sq. In.	of Blow, Min.	Cor	averter S	lag	1	adle Sla	K.
		C					SiO ₂	Iron	Mn	SiO ₂	Iron	Mn						
No. 1.	Without scale	4.34 4.21	1.96	0.84	18,640 19,180		3,163 2,130	1,210	21,800 22,520	1.80 1.90	23 23	19.0 12.5	65.27 61.80	15.30 17.5)	8.11 7.84	53.12 50.10	15.70 16.20	14.00 13.44
No. 2,	Without scale With scale	3 98 4.06	1.60	0.76 0.77	19,000 19,000		11100	1,000	22,000 22,000	1.63	25 25	18.6 10.0	63.60 62.26	16.20 17.70	8.11 8.64	48.06 48.64	15.60 16.50	12.84 12.97
No. 3.	Without scale	3.92 4.00	1,62 1.96	0.70 0.75	19,100 19,200		*****	1,400	22,600 23,100	1.62	25 25	18.9 11.3	65.34 63.40	16.50 16.50	8.24 8.15	50.48 52.04	13 00 15 90	11.50 12.94
So. 4.	Without scale	4.24 4.00	1.79	0.64	19,020 19,080	2,540 1,550	*****		21,560 21,630	1.80	25 25	15.0 10.2	63.50 60.50	14.50 18.70	6.82 8.01	47.40 47.00	18,20 16,10	18.21 16.95
Average	rs	4.08	1.82	0.74						1.73								

Note. The average weight of all converter slags produced for this month was 2,010 lb. per heat. The ladie slag averaged 417 lb. per heat and was quite constant.

than the combined iron in the larger volume of slag due to a higher content of silicon. As the per cent of combined iron in the slag has been found to be practically constant, this would be lost in any case in proportion as the silicon in the charge is raised, which we maintain is warranted to a certain extent on the basis of better quality alone.

Against this loss, most of which is in consequence of the larger volume of slag produced, we must credit a 20 per cent reduction on steam cost and a similar reduction in most of the other items of cost, together with a 10 per cent increase in scrap-melting capacity due to the use of higher silicon iron. It is hardly necessary to produce further figures, even if we had them, to indicate that there is a substantial saving in cost of production by this practice. It may be said that it costs a little more to make the higher silicon iron, but this is obviously more than offset by the advantages obtained, some of which, such as increased yield of finished product, are difficult to compute.

We have attempted to give briefly the results of ten years' experience in the use of roll scale under the conditions that prevail at this particular plant. However, in summing up the benefits derived, as "better steel," "increased production" and "lower cost," we would not have the reader conclude that this is a "cureall," as the practical Bessemer operator will readily appreciate that there are many other details such as temperature, ladle reactions, etc., which will require just as much attention as ever. Aside from all other factors, however, the judicious use of roll scale is a study within itself.

Fused Bauxite as a Refractory

Refractory materials suitable for furnace linings and for crucibles are claimed possible as a result of new methods of preparing bauxite made public by M. N. Lecesne in a recent issue of *La Ceramique*. The material is a result of the following procedure:

A mixture is prepared of one part of anthracite and three parts of bauxite of average composition (about 60 per cent of alumina, 10 per cent of iron sequioxide and 10 per cent of silica), and in the state of moisture in which it comes from the quarry. The mass is charged into a furnace lined with refractory material (preferably fused bauxite), and previously heated up with anthracite, air being blown through the charge at an initial pressure of about 40 in. water gauge, rising afterwards to as much as tenfold that pressure, according to the depth of the charge, though 160 in. of pressure is The temperature rises quickly and the usual maximum. sudden vaporizing of the water in the bauxite causes the latter to break up and granulate, while the aluminum carbide which is produced burns and raises the charge to over 3000 deg. of incandescence. In consequence, the silica is volatilized and the iron, reduced by the action, is expelled by the air blast as a shower of sparks which in contact with the outer air are transformed into magnetic oxide. The air blast is continued The air blast is continued, to burn off the surplus anthracite and cool down the fused mass, which can then be discharged from the furnace and ground, mixed with crude or calcined bauxite as molded, dried and fired in the same way as calcined bauxite.

If the fusing process is performed quickly, or in about three hours, the resulting mass will be highly porous, besides containing a sufficiency of unconsumed anthracite to facilitate grinding and briquetting. The fused bauxite constitutes an artificial corundum which will give a refractory material capable of withstanding a temperature of over 2000 deg. C. if mixed with some of the same material, freed from iron by magnetic separation, and with water and quicklime, the latter forming a binder of silicate of lime. In association with bauxite (1 part to 9 of the corundum) the product is hard, but porous, and forms a suitable lining for reverberatory furnaces and those heated with liquid or gaseous fuel.

The total number of establishments now under control of the Ministry of Munitions of Great Britain is 4942. Incidentally it is proposed to extend as necessary the principle of dilution to particular classes of work not now undertaken by women and also the transference of operatives from one district to another.

MANGANESE ORE OUTPUT

Large Increase in Domestic Mining for This Year Is Predicted

Washington, July 10.—The demand for manganese has greatly stimulated development and prospecting in the United States and miners everywhere are responding to such purpose that the Department of the Interior estimates that the domestic output in the calendar year 1917 will be trebled. In a formal statement concerning the increased production of manganese, Secretary of the Interior Lane says:

"Modern steel making demands manganese, and the shortage of a domestic supply of this ore has been a matter of concern to those of us who wish America to be industrially independent. But now the war requirements for steel have been realized by the manganese operators, for reports already received in the Department of the Interior show that shipments of high grade manganese during the past six months aggregate 28,345 tons, or nearly 10 per cent more than the tonnage for the whole 12 months of 1916, which amount in turn was three times the 1915 shipments. Shipments are reported from 10 States, but in Montana alone the shipments since last January largely exceed the shipments for the whole United States in 1915.

the shipments for the whole United States in 1915.

"The manganese situation, therefore, is most encouraging and the United States Geological Survey estimate for the whole year is 80,000 tons of the high grade ore. This, however is less than 20 per cent of the present large demand of the steel industry. Yet it is significant that the shipments of lower grade manganese ore likewise are record breaking, the six months of 1917 considerably exceeding the 12 months of 1916, and the present rate of production promises an even larger tonnage for the remaining six months. This gratifying activity in the mining of so essential an ore seems to be largely the result of better financing and better engineering of the industry, which in turn is simply another expression of how America is meeting the present crisis in American fashion."

Standardizing Motorcycles

At the suggestion of the War Department a number of motor cycle engineers representing the entire American motor cycle industry held a meeting in Washington during the past week to consider the extent to which the parts of motor cycles can be made interchangeable. These experts who met under the auspices of the Society of Automotive Engineers in co-operation with the automotive transport committee of the Council of National Defense agreed upon numerous immediate steps looking to the ultimate interchangeability of parts will all be brought to stated dimensions, but no effort will be made to enforce these standards upon motor cycle manufacturers. There is little doubt, however, that this movement will result in great progress toward the general standardization of the entire industry.

Return to Work

An agreement has been reached between the Orbon Stove & Range Co., Belleville, Ill., and the molders' union whereby the men returned to work June 28 after a strike of several weeks. The original cause of the trouble was a strike of stove mounters and steel range workers who called out the foundry laborers and made it impossible for the molders to work. Subsequently an injunction was issued restraining the unions from interfering with operations at the plant, and the molders, when they learned they were included in the injunction, refused to work until the order was removed. The injunction which affected the molders was dismissed July 3.

McCrossin & Darrah, American Trust Building, Birmingham, now represent the Link-Belt Co., Chicago, in Alabama. E. Francis McCrossin and John F. Darrah are experienced in Link-Belt engineering work.

Post-War Business Relations with Germany

A metal merchant, in a communication to the Lonlon Ironmonger, has the following to say regarding usiness relations with Germany after the war:

The home trade problem is easier to solve than the juestion of raw materials, and the general question of raw

New Navy Specifications for Steel Castings

New specifications governing the manufacture of steel castings, have recently been issued by the United States Navy Department. They are dated May 1, 1917, and are designated as 49 S1d superseding those issued June 1, 1916. The chemical and physical properties demanded by those specifications are as follows:

					Physic	cal Requiren	ients-							
	Che	mical			Minimum	Minimum								
	Comp	osition,	Minimum Ten	- Minimum	Elongation	Reduction								
	-Not	Over-	sile Strength	, Yield Point,	Per Cent	of Area,		Be	nding '	Test	; Cold	Bene	1	
rade	P.	S.	Lb. per Sq. In	. Lb. per Sq. In.	in 2 In.	Per Cent			(Not	Less	s Tha	n)		
F	0.05	0.05	85,000	53,000	22	35	120	deg.	about	an	inner	dla.	of	1 in
A	0.05	0.05	80,000	45 per cent of	17	20	90	deg.	about	an	inner	dia.	of	1 in
D	0.05	0.05	70,000	tensile strength	22	30	120	deg.	about	an	inner	dia.	of	1 in
В	0.06	0.05	60,000	obtained.	22	30	120	deg.	about	an	inner	dia.	of	1 in
C	0.06	0.07	****		* *									

materials is easier to deal with than the question of trade

with neutral countries and with the Empire.

Take as an example bar iron for export. After the war our price may be for some time about £10 per ton, and the German price, to "get in" again, may be equal to £6 10s. per ton. If we arrange as an Empire matter that no German bars are to be admitted into our colonies or dependencies, which, I take it, is on the lines of Mr. Rawlins' desires, the result will be that the Indian and Egyptian peoples will be forced to pay 50 per cent more for their iron than their neighbors in the Dutch East Indies or in Turkey.

Two undesirable results would follow: First, it would force certain trades into German hands; and, second, it would give cause for grave discontent in India and in Egypt from buying in the cheaper Dutch East Indies or in Turkey.

A minor matter would be the difficulty of preventing Egypt from buying in the cheaper Turkish market and the Indian people from the cheaper Dutch market. More than this, there is the problem of our Allies. Is it not likely, for instance, to injure our position with the Russian democracy if the attempt is made to force them to buy dearer bar iron from the Allies than they can get from Germany, and would it not help the strong movement in Russia for immediate restoration of friendly relations with Germany, if Germany, the cheap and anxious seller, is barred from commercial relations in the interests of British trade?

I am not arguing the position, but only suggesting points that have to be considered in relation to the whole, and I mention bar iron because it is best to have something definite in mind and not because it is the best or the only illustration.

Two things should be kept well in mind. First, the desirability of making, as a condition of peace terms, the complete restoration of machinery and plant to the destroyed works in France and Belgium before German export trade is allowed; and, second, to make our own fiscal arrangements regarding raw materials with the view of our being able to compete favorably in the world's markets in price as well as in quality.

The Joseph F. Wangler Boiler & Sheet Iron Works Co., St. Louis, has removed its general offices from its long established location at 1547 North Ninth Street to 911 Federal Reserve Bank Building, 415 Pine Street, in that city. The company manufactures steam boilers and tanks and constructs boiler plate and sheet iron work. Joseph A. Wangler, who has been connected with the company for more than 25 years, is president.

The R. B. Phillips Mfg. Co., Worcester, Mass., has been sued for \$45,000 by the George Q. Hill Co., Boston, for alleged breach of contract. The Hill company claims that the Phillips company delivered only about one-fifth on a contract for 1,000,000 adapters and 1,000,000 caps for the British fuse No. 101, and that the alleged failure to deliver made it impossible for the George Q. Hill Co. to fulfill its contract.

The Portage Refrigerator & Heater Co., Portage, Pa., recently incorporated in Delaware with a capital of \$100,000, is making rapid progress in the erection of a new plant and plans for early occupancy. The new works will be used for the manufacture of refrigerators and steam and electric heaters.

It will be seen that the sulphur requirements are not over 0.05 per cent in all grades of castings except Class C which is not tested in any way and is regarded as the least important. The purpose for which each grade is used is revealed by the following paragraph from the specifications:

Grade A is intended for all important parts subject to crushing stresses or surface wear only, such as hawse pipes, chain pipes, turret roller paths, engine guides, slippers, etc.

chain pipes, turret roller paths, engine guides, slippers, etc.

Grade B is intended for parts subject to tensile or vibratory
stresses, such as stems, sternposts, stern tubes, rudder frames,
struts, engine bedplates, cylinders, gun-mount stands, carriages, slides, and other parts subject to the shock of recoil.

Grade C is intended for gun mounts, such as brackets, levers, wheels, etc., not subject to shock of recoil, and for commercial fittings where structural strength and separation of water-tight compartments are not involved, such as pipe flanges (other than bulkhead and deck), cagemast fittings, stowage lugs and clips, hinges for doors and hatches where water-tightness is not involved, etc.

Grade D is intended for the same general purpose as grade B, but where greater strength is required with equal ductility.

Grade F is intended for castings for gun yokes, gun mount stands, carriage slides, deck lugs, etc., of large size.

The latest specifications of the Navy for structural steel work, dated Feb. 1, 1917, and designated as 48 S1c, demand not over 0.05 per cent sulphur and phosphorus in all steel castings used in yards and docks and similar work and limit the sulphur to 0.045 per cent for rivet steel for bridges and buildings.

It is known that in many cases it is difficult to meet a sulphur specification of not over 0.05 per cent in recent months, even in acid open-hearth work. The intensive stress for output under which blast furnaces and coke plants have had to operate has tended to increase rather than diminish the quantity of sulphur in these raw materials, thereby making it still more difficult for steel makers to meet specifications.

Aeronautical Research Laboratory

The National Advisory Committee for Aeronautics has just closed a contract with the J. G. White Engineering Corporation for the erection of a research laboratory on Langley Field, near Hampton, Va. At this laboratory, in addition to the usual structural tests on airplanes and airplane parts, scientific research peculiar to aeronautics will be conducted under the immediate supervision of the committee. The laboratory will comprise complete machine, instrument, and pattern shops, as well as a drafting room with the most modern equipment.

The coal handling machinery and accessories at the Naval Station, New London, Conn., are for sale. The equipment consists of Brown patent bridge tramways, hoisting engines, boilers, self-dumping coal tubs, etc., and a coal shed containing approximately 430 tons of structural material. The sealed proposals for this material will be opened at 1 p. m., July 16.

Tremendous Demand for Machine Guns

Great Task of Meeting Government Requirements to Be Submitted to Manufacturers-What the Building of Thousands of Airplanes Means

WASHINGTON, July 10 .- The greatly increased importance of the machine gun for use on land, water and in the air promises to tax the productive capacity of all private plants equipped to manufacture these weapons and the Government has now put squarely up to the producers the serious problem as to whether the demands of the nation can be adequately met. The machine gun is a distinctly modern factor in offensive and defensive warfare on land, but the most recent development in its use is due to the progress made within the past year or two in the utilization of the submarine and the aeroplane. It is now the firm conviction of the ablest military and naval experts that, notwithstanding the great increase in the use of the machine gun by the infantry, an even larger number will be employed on the water and in the aerial service.

When the European war began the actual equipment of the United States Army was from one to three machine guns per regiment. Early observations of infantry tactics on the western war frontier demonstrated to our experts with the French and British armies the wisdom of the use of a much larger number of machine guns than was ever before regarded as practicable, and, based on the work of the infantry of the Allies, it was decided to increase our machine gun equipment to 12 guns to the regiment. This decision involved supplying the army with six or seven times as many machine guns as had previously been thought necessary and, with the decision to put an army of 2,000,000 ultimately in the field, it meant the manufacture of approximately 20,000 of these weapons.

The arming of merchant ships and the equipment of swift naval vessels and small auxiliaries to fight the submarines gave the next impetus to the machine gun, and a short time ago the navy ordered no less than 1600 improved Marlin rapid firing machine guns designed especially to shoot at submarine periscopes. The ultimate needs of the navy for all purposes will probably amount to several times this number and will

include one or more additional types of gun.

Building a Great Air Fleet

The latest and by far the most important development in the machine gun requirements grows out of the decision of the war administration to attempt the construction of an immense fleet of airplanes, each carrying one or more guns. The immediate object of the authorities will be to authorize the building of at least 20,000 planes, and this number may be doubled or quadrupled should the war last beyond the calendar year 1918. It is becoming more and more apparent that, in view of the unlimited capacity of the allied nations to build airplanes and the military superiority over the German forces which a great fleet of airships would give the allied armies, the most promising method of shortening the war is to adopt the urgent recommendations of our military observers in Europe and to take up the manufacture of aircraft and all the adjuncts thereof upon a stupendous scale.

Summarizing the latest estimates for machine gun requirements for all purposes, it is seen that the regular infantry forces of the United States, the new national army and the militia, will require at least 25,000 guns, the navy 4000 or 5000, and the great projected air fleet anywhere from 20,000 to 50,000, depending upon the number of airplanes actually authorized by Con-

That the War Department is keenly alive to the magnitude of the task before it in providing machine guns there is ample evidence. While the present policy of the department in the matter of disclosing its plans is decidedly conservative, the following authorized state-

ment will indicate what is being done to meet the great emergency now confronting the country:

The subject of machine guns, their design and supply, necessarily required a great deal of attention on the part of the War Department. On Oct. 2 last, a board of officers was convened, upon which both the army and navy were represented, with instructions to make tests of machine rifles and recommend as to the type which should be employed in the United States Army. The board has had a number of meetrings, and has carried out a program of tests which occupied practically all of the month of May. It tested 18 different types of machine guns, of which eight went clear through the test, surviving to the end, while the others fell out at various

Machine guns can be divided into classes along several ferent lines. They may be classified as air-cooled guns and different lines. water-cooled guns, depending upon the nature of the reliance for keeping the barrel as cool as possible under the heating action of rapid fire. Some systems surround the barrel with a water jacket, while others depend upon circulation of air about the barrel, either natural or forced. They may also be classi-fied as recoil-operated guns or gas-operated guns. In the recoil-operated guns a certain movement is permitted to the barrel and this movement sets in motion the mechanism for withdrawing the empty cartridge case, ejecting it, cocking the piece, reloading a new cartridge, and firing; in gas-operated guns this mechanism is actuated by the pressure of the gas which is obtained from the barrel by tapping it at a point some distance down toward the muzzle.

The most recent classification of machine guns is into heavy type and light type. The heavy guns are those of greatest reliability and greatest capacity for continuous action, and they are used in positions where these qualities are considered so necessary as to more than overcome the disadvantage of increased weight of the guns, or where, on account of lack of necessity for the easy movement of the guns, weight is not material. The light type comprises those which are light enough to be easily carried by a man in a forward movement, and in which, for the sake of lightness, the capacity for continuous fire is to a certain extent sac-rificed. These light-type guns have been refined down by recent invention until some of them now weigh not more than 14 pounds, and can be easily carried and fired by one man, who can shoot from the hip while advancing. These lighttype guns are sometimes called automatic rifles, but this is through paucity of vocabulary, since all modern machine guns

Machine guns form the essential armament of fighting roplanes. The aeroplane service gives a particularly good neroplanes. opportunity for the air-cooled type, since long-continued firing is not necessary, and since the rapid motion through the air assists in cooling the barrel.

The machine gun board, as a result of its labors, found itself able to recommend satisfactory types of guns of both kinds, and it is now up to the manufacturing talent of the country to produce them in the large numbers in which they It is not deemed wise to disclose the prowill be required. gram of manufacture nor to render prominent by publication the places where manufacture is likely to be carried on, but it will be gratifying to the country to know that in the tests and conclusions of the machine gun board it was abundantly shown that American invention has not been asleep.

Congress Favors Airplanes

It can be stated very positively that the War Department will have the active co-operation of the leaders of both Houses of Congress in its plans for a great air fleet. The House Committee on Military Affairs last Friday began consideration of a series of bills to authorize the aircraft program as submitted by Secretary The chief measure on the committee's docket calls for an initial appropriation of \$630,000,000, of which \$363,000,000 would be expended in the purchase of 22,625 airplanes and 45,250 engines, while the remainder would be used in the construction of training camps and the training of a large number of aviators. Another bill relates to the organization and personnel of the aerial corps, and clothes the President with authority to obtain the necessary men by draft, if luntary enlistment fails to meet the requirements 75,000 men, which is the War Department's latest e-timate.

In the construction of the required number of airanes and engines, the War Department is proposing utilize the facilities of several of the largest automobile plants in the country. Already representatives of the department have visited these plants and have egun negotiations to ascertain the terms upon which he airplanes and engines can be turned out with the greatest possible rapidity. As the period of service-ability without overhauling of an airship engine is only some 300 hours, it is absolutely essential that each airplane should be supplied with two engines, and in view of the large number to be utilized in France, it is regarded as highly important that they should be thoroughly standardized with interchangeable parts. The airplanes will probably be of at least three typesfor instruction, scouting, and actual fighting, the last mentioned type being the heaviest and capable of carrying, in addition to crew and armament, considerable quantities of bombs and explosives.

Airship Engine Problems

No decision has yet been reached on the important question as to whether the actual construction of airship engines will be deferred until a standardized type has been worked out by the advisory committee for aeronautics, but it is probable that at least one type of engine now in use will be employed for the equipment of such aeroplanes as are delivered within the next six months, while the "All America" engine will be utilized for subsequent deliveries.

The Navy Department has taken steps to greatly increase the output of submarine chasers to be armed with machine guns and weapons of larger caliber, and it is stated that in the near future a considerable number of the small light vessels of the chaser type may be added to the American fleet in European waters. The first of the standardized chasers has successfully undergone her trial runs with results that convince the officials that a type of great value in the fight against submarines has been produced. Several hundred additional vessels are now under construction in navy yards and private plants and within the past week orders been issued almost doubling the number which will be turned out within the next six months. task of securing engines for these vessels has proven a difficult one, as the Navy Department, for obvious reasons, does not wish to employ too many different types. It has been necessary to purchase engines built several manufacturers, but upon similar designs, and a fairly satisfactory number have been procured. With a view to efficient operation and quick repair, all submarine chasers sent into European waters will probably be equipped with the same type of engine.

W. L. C.

New Company Takes Over Snyder Furnace Patents

The Industrial Electric Furnace Co., an Indiana corporation, has acquired the business of the Snyder Electric Furnace Co. and the Snyder patents and designs of electric furnaces and processes. The directors of the new company are Charles B. Sommers, Stoughton A. Fletcher and Charles B. Fletcher, of Indianapolis, and F. Von Schlegell and F. T. Snyder, of Chicago.

The company will start with an engineering force and will take up the manufacture of electric furnaces for steel work, will enlarge the plant at Clearing both for electrometallurgical developments and for the commercial production of electric furnace products. Mr. Snyder, who will be interested in and associated with the new company as engineer and metallurgist, has had many years of experience in the electric furnace field and was the inventor of the Snyder furnace. The executive officers of the company will be F. Von Schlegell and Charles B. Fletcher. The offices will be at 53 West Jackson Boulevard, Chicago.

Ten Miles of Welded Pipe

To make 10 miles of pipe as one continuous pipe, with every joint leak-proof and trouble-proof after being buried in ice, was the problem that confronted



Ten Miles of Pipe in the Ice Skating Ring at San Francisco, Welded from Pieces of Used Galvanized Pipe

the builders of the Winter Garden ice rink at San Francisco. Investigation had shown that in many ice rinks where ammonia systems were built with screwed fittings, leaks frequently developed in the joints, necessitating shutdowns for repairs. Oxy-acetylene welding by the Prest-O-Lite process was used, and instead of using new pipe, 55,000 ft. of 2-in. used boiler tubing was purchased at a saving of 20 per cent over the cost of new galvanized pipe. The floor is 210 ft. long and 90 ft. wide, and there are some 2000 welded joints.

The contractors claim the work was done by average welders and that the cost per joint was approximately the cost of an ordinary screw connection. The rink has been in operation for about six months, and the management reports that not a leak has developed.

Analyses of Ores

Washington, July 10.—With a view to correcting various misapprehensions which appear to exist in the minds of the mining public, especially in the West, as to the policy of the Bureau of Mines of the Department of the Interior in making analyses or assays of ores, Director Van H. Manning of the bureau has made the following statement:

"The Bureau of Mines is not authorized to make analyses or assays for the sole benefit of private parties, its function being rather to investigate problems of general interest and importance to the mining industry, and to publish the results of these investigations for the benefit of the industry and the general public.

"The bureau, however, desires to assist miners and prospectors in every way possible, and, if desired, will be glad to furnish a list of private chemists and assayers doing this kind of work. In supplying such a list, the bureau cannot, of course, undertake to recommend or favor any particular laboratory or individual, or tests made by these laboratories.

William B. Pollock Co., Youngstown, Ohio, has nearly completed the erection of a 500-ton blast furnace for the Whitaker-Glessner Co. at Portsmouth, Ohio. This new stack will make pig iron for the open-hearth steel plant of the company at Portsmouth. The Pollock company also has a contract for the building of a large blast furnace for the Tata Iron & Steel Co., Sakchi, India. The company built the new 550-ton blast furnace for the Republic Iron & Steel Co. at Haselton, Ohio, which was blown in recently.

IS HOPING FOR HARMONY

President Wilson's Attitude on Ship Controversy-More Money Will Be Asked

WASHINGTON, July 10.—Congress will be asked for an additional \$500,000,000 to carry out the program of the United States Shipping Board, which has been expanded to include at least 5,000,000 tons dead weight of shipping in addition to vessels already under construction for private account which will be taken over The original allotment carried by the Government. by the war budget bill, including the amount actually appropriated and that authorized merely, to be appropriated hereafter, was \$755,000,000, so that the amended project involves expenditures aggregating more than one and a quarter billion dollars. Chairman Denman of the Shipping Board is authority for the statement that a supplemental estimate will be prepared, but as this must receive the President's approval, it is not likely to be forwarded to Congress immediately, although it is the best opinion here that the Chief Executive will ultimately indorse the proposed increase in the cost of the emergency fleet of cargo vessels. The question as to whether steel or wood will be used in the construction of the additional 2,000,000 tons of emergency shipping, is not at issue in this connection. Chairman Denman, in an informal statement with regard to the board's action, says that more steel contracts can be placed and that "the vast resources of quick wood construction are far from exhausted." Many wooden ships, he says, can be built having greater speed than the majority of the vessels now crossing the war zone.

General Goethals, the manager of the Emergency Fleet Corporation, declines to comment upon the supplemental estimate for funds for the Shipping His friends, however, express the opinion that the expansion in plans of the board emphasizes the importance of the early determination of the interesting question as to who is to exercise supreme authority in the construction of the emergency fleet, and it is pre-dicted that, unless the President clothes him with full authority, General Goethals will tender his resignation. The President is extremely reluctant to take any action that will force an issue between Chairman Denman and General Gocthals and will exhaust every resource to keep both men at their posts. He is said to be of the opinion that if a direct issue can be held in abeyance until the bulk of the contracts for vessels have been let and the Federal Trade Commission has fixed a basis for the settlement of the vexed question as to the price of steel plates and shapes, the strained situation in the Shipping Board will relax and it will be practicable for both Chairman Denman and General Goethals to continue in office. Both officials now agree that wooden vessels as well as steel should be built to the capacity of the American shipyards, and as the question of the price to be paid for steel will probably be determined by the President, it would seem possible that all controversial issues in the board may be settled without forcing the resignation of either the chairman of the board or the general manager of the corporation.

Large Manganese Ore Imports in May

Manganese ore imports into the United States in May were the largest for any month this year or in many months previous. The total was 81,269 gross tons, bringing the total to June 1, 1917, to 254,012 tons. This is at the rate of 50,802 tons per month for this year, as compared with 48,026 tons as the 1916 monthly average, then the record. The largest previous imports this year were 56,394 tons in March. For the 11 months ended May 31, 1917, the total imports have been 593,310 tons or the largest for any similar period, even exceeding the record total of 576,321 tons in all of 1916.

The name of Kugel-Miner-Morse, Inc., Erie, Pa., dealer in iron and steel products, has been changed to Miner-Morse Corporation.

British Steel Exports and Imports Groving Despite Submarines

British steel exports in May were 199,418 gross tons, excluding iron ore and including scrap, which compares with 180,869 tons in April. The extent to which they have been restricted is illustrated by the fact that in May, 1916, they were 395,750 tons and in May, 1915, they were 267,524 tons. The May exports rank third in magnitude for the first five months of this year, with the average to June 1 at 203,377 tons per month as compared with 279,819 tons per month in 1916.

Pig-iron exports in May were 60,644 tons against 51,041 tons last April and 83,839 in May, 1916. Ferroalloy exports, largely ferromanganese, in May were nearly 50 per cent less than they were in May, 1916, or 7557 tons against 14,137 tons. The monthly average to June 1, this year, has been 9016 tons as compared with 11,260 tons per month in the same period in 1916.

May exports of rails were only 1689 tons and were 10,500 tons less to June 1, 1917, than to June 1, 1916. Steel-bar exports are steadily falling off. In May they were only 19,537 tons as compared with 27,840 tons in April this year and 80,205 tons in May, 1916. The total to June 1, 1917, or 150,969 tons, is only 50 per cent of the exports to June 1, 1916.

Imports of steel in May, excluding iron ore and including scrap, were 39,181 tons, the largest since unrestricted submarine warfare started. Since February imports have increased from 27,428 tons in that month to 39,181 tons in May. The average to June 1 was 33,737 tons and the May imports were next to the largest this year. Imports this year, however, are nearly 50 per cent less than in the same period in 1916 when the average to June 1 was 64,649 tons per month.

Both manganese ore and iron-ore import statistics for May are not given this time for the first time since the war.

The Tin-Plate Situation

The Department of Commerce announces that the committee on the conservation of tin plate "recommends to the Secretary of Agriculture and the Secretary of Commerce that inasmuch as the patriotic and hearty response to the previous recommendations of the committee regarding the use of tin plate has resulted in material relief in providing cans for the early crop of perishables, tin-plate manufacturers no longer refrain from shipments of plate to those packers making their own cans, when such cans are likely to be used for the packing of nonperishable food products." The committee also recommends that can makers no longer be required to withhold shipments of cans to be used for the conserving of food products.

Great pressure is being brought to bear upon the Government by manufacturers of other than food products to secure permission to use tin plate for the making of containers. In many cases it appears that none of the substitutes suggested by the Government, such as glass, wood, fiber, paraffined paper, etc., will serve the purpose of these manufacturers who are threatened with the complete loss of their business as the result of the tin-plate situation. While the officials regret the conditions that have developed as the result of the tin-plate control, there is nothing that can now be done to remedy the matter.

The American Locomotive Co. formally took possession on July 2 of the Seaboard Steel Casting Co., Chester, Pa., which it recently purchased from the Penn-Seaboard Steel Corporation. The name Seaboard will be retained and the plant will be known henceforth as the Seaboard Works of the American Locomotive Co. There are to be no changes in the works or office management. Everett Sproul will continue as works manager, and David G. Stokes in charge of the office.

Hilb & Bauer, Cincinnati, scrap merchants, have removed their offices from the fifteenth floor of the Union Trust Building to larger quarters on the fourth floor of that building.

NAVAL PROJECTILE PLANT

Plans Have Been Prepared-Bids on Machinery Are Received

WASHINGTON, July 10 .- Plans and specifications for the naval projectile plant to be erected at Charleston, Va., have been completed and bids for the erection of the buildings will be opened by the Bureau of Yards and Docks of the Navy Department July 16. The plant was appropriated for in the last annual appropriation act and will be located on the tract of land acquired by the Government for the projected armor The original intention to push the conplant factory. struction of the armor factory ahead of the projectile plant has been abandoned and there is now little prospect that the building of the armor factory will be undertaken in the near future. The projectile plant, however, will be proceeded with as rapidly as possible, and the Navy Department announces that no bid will be considered that is based upon a time of completion of more than 365 calendar days.

With a view to equipping the projectile factory as soon as the buildings are ready, the Navy Department has solicited and received bids on the principal items of machinery to be used. The schedule includes the following items, and while the awards have not yet been made, the name of the lowest bidder in each case is here presented:

One 3000-ton straight hydraulic (no steam) piercing press, including hydraulic intensifier. Lowest bidder, United Engineering & Foundry Co., Pittsburgh, \$99,400.

Two 500-ton hydraulic piercing presses. United Engineer-

ing & Foundry Co., \$23,750.
Four motor driven hydraulic pumps. Edward J. Smith,

agent, Washington, \$41,825 Three 6-ton electric furnaces. American Bridge Co., Washington, \$45,500.

Two 6000-lb. ingot manipulators. Wellman-Seaver-Morgan Co., Cleveland, \$21,600.

Two 40-in. heavy-type, rapid-production, shell stock, coldsaw cutting-off machine, with direct-connected motor drive, holding jigs, and stock-feed devices. Newton Machine Tool

Works, Philadelphia, \$3,290.
Four 36-in. by 14-ft. double back-geared engine lathes.
Brown & Zortman Machinery Co., Pittsburgh, \$2,037.

Seventeen 30-in. by 16-ft. heavy projectile turning lathes. Himoff Machine Co., Astoria, Long Island, N. Y., \$4,540.
Twelve 30-in. by 18-ft. heavy projectile boring lathes. Himoff Machine Co., \$5,150.
Four 36-in. by 14-ft. triple-geared lathes. Niles-Bement-

Fond Co., New York, \$6,550.

Eleven 36-in. by 20-ft. triple-geared lathes. Houston, Stanwood & Gamble Co., Cincinnati, \$6,425.

Three 24-in. heavy duty turret machines, motor driven. Steinle Turret Machine Co., Madison, Wis., \$5,198.

Four 24-in. heavy duty turret machines, motor driven. Swind Machinery Co., Philadelphia, \$5,717. Four heavy duty combination thread-milling and turret

machines.

chines. Swind Machinery Co., \$5,099. Four heavy duty combination thread-milling and turret Swind Machinery Co., \$5,430.

Three heavy duty combination thread-milling and turret chines. Swind Machinery Co., \$4,677.

Two forging hammers, one of 1100 lb. and one of 2500 lb.

Manning, Maxwell & Moore, New York, \$6,178.

While the bids received for this machinery compare very favorably with current prices for similar equipment for private establishments and for export, they will materially exceed the allotment of the appropriation for these fixtures, and the Department is in a serious quandary as to the best method of meeting the situation. It is not regarded as advisable at this time to seek a larger appropriation at the hands of Congress, which might open up the long-standing controversy concerning the wisdom of the Navy Department's policy of manufacturing projectiles on a large scale. probable that the Department will seek, through negotiation, to secure lower prices for this equipment and it is more than likely the purchase of the least essential items will be postponed until other funds are available.

The principal buildings of the plant are four in number, including a machine shop, a foundry and forge shop, a heat treatment shop, and a lavatory and locker

building. The Department hopes to include the four buildings in a single contract. The machine shop will be 111 by 402 ft. and will consist of a main span with a side span on each side and a lean-to extending along a portion of one of the side spans. With the exception of the tool room at one end there will be no dividing Girders will be required for overhead ridge cranes in each span. The building, partitions. traveling bridge cranes in each span. The building, supported on concrete foundations, will have structural steel frame, concrete foundation and base course, hollow tile block belt courses and pilasters, steel sash for window areas, built-up roof covering over gypsum composition or concrete slab roofs. The floor will be all concrete.

The foundry and forge shop building, the largest of the group, will be 560 feet long by 135 feet wide and will consist of a main span flanked by side spans. general construction, window areas, roof, etc., will be similar to the machine shop building. The sides and ends of the building will be left open for a height of several feet above the base course and no floor will be required.

The heat treatment building will be 92 by 153 ft. and will consist of two spans with a line of interior The construction will be similar to that of the machine shop and foundry and forge shop.

The lavatory and locker building will be 75 by 12 ft. and will be a one-story, hollow tile block structure on concrete footings and foundation wall. Window sills and lintels will be reinforced concrete. The floors will be concrete and the interior walls will be plastered.

The bill of materials for the four buildings will include considerable quantities of iron and steel, including the following items:

Reinforcing steel, 38 tons; cast iron drainage pipe with fittings, 6 in. to 12 in., 4044 lin. ft.; steel pipe for downspouts, with all fittings, 4 in. to 6 in., 3318 ft.; structural steel, 2330 tons; steel sash, walls (pivoted and fixed), 5620 sq. ft.; steel sash, monitor (top hung), 11,350 ft.; steel doors, 2129 sq. ft.; steel stairs, 12,200 lb.; pipe railing, 30 lin. ft.; wire partitons, doors and frames, 3190 sq. ft.; steel ralls for railroad tracks, new 80-lb., A. S. C. E., 158 tons; steel ties, splice bars, bolts, nuts, frogs, switches, etc., 35 tons.

W. L. C.

Brass Manufacturers Meet

The summer meeting, June 25 to 28, at Hotel Hollenden, Cleveland, of the National Association of Brass Manufacturers was largely attended and several matters of importance to the members were acted upon. The association discussed freight equalization and a zone chart showing the correct freight equalization of every shipping point and destination in the United States was presented. The matter was referred to a committee comprising Messrs. Johnson of Illinois, Gillette of Pennsylvania and Harper of Wisconsin. The possibility of removing the technical specifications now applying on Government purchases of brass goods was discussed at some length and the matter referred to the committee on standardization.

The members expressed by a rising vote of thanks their appreciation of the labors of the cost committee which submitted a final preliminary report that was notable in its completeness and thoroughness. The committee included Messrs. Burleigh, H. Mueller Mfg. Co., Decatur, Ill.; Whitaker, L. Wolff Mfg. Co., Chicago; and Sanders, Standard Sanitary Mfg. Co., Pittsburgh. The next meeting will be held in Milwaukee, Sept. 27 and 28, 1917.

The Halcomb Steel Co., Syracuse, N. Y., recently absorbed the new works of the Syracuse Crucible Steel Co. and the latter ceases to exist as a separate unit. It is a large and finely equipped crucible steel and rolling mill plant, adjoining the Halcomb unit, and the merger makes the operation the largest of its kind in the country.

The Bridgeport Brass Co. of Bridgeport, Conn., announces the removal of its New York office to Suite 2236, Woolworth Building, 233 Broadway.

ESTABLISHED 1855

THE IRON AGE

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Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, Pres, and Treas.

Charles G. Phillips, Vice-Pres.

Fritz J. Frank, Secretary

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BRANCH OFFICES—Chicago: Otis Building. Pittsburgh:
Park Building. Boston: Equitable Building. Philadelphia:
Real Estate Trust Building. Cleveland: Guardian Building.
Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year; single copy, 20 cents; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

The Embargo on Exports

If the embargo on exports proclaimed by the President were strictly enforced as to iron and steel exports to neutral countries it would not materially affect the trade. Exports to belligerents, it is to be presumed, are to be encouraged. The iron and steel items involved are scrap, pig iron, billets, structural shapes, ship plates and ferromanganese. The neutrals are not iron and steel producing countries, to any extent, hence do not need scrap, pig iron, billets or ferromanganese, as they would have no means of utilizing them. Information has been collated at Washington showing that Sweden has exported large quantities of iron ore and pig iron to Germany, and has imported some pig iron from the United States. While it is important that our contribution to Sweden's ability to supply Germany with ore and pig iron be discontinued, the quantity to be released is an insignificant portion of our production, as our pig iron exports to Sweden in the first quarter of this year were only 16,000 tons.

It is only in the highly finished manufactures of iron and steel that our exports to neutral countries have lately been of moment, typewriters and sewing machines being conspicuous examples, but even in these our exports to the European Allies have greatly preponderated.

Our iron and steel exports to the European Allies, it must be remembered, are by no means all our exports to the allied belligerents. We have had large exports to Canada and Japan. There have been considerable exports of such items as locomotives, cast-iron pipe, structural shapes, etc., to Cuba, but Cuba is one of our Allies.

As scrap, pig iron and billets do not go to neutrals because they cannot utilize them, so also the two finished steel products included in the embargo have not been passing to neutrals to any great extent, the exports being chiefly to the European Allies, particularly England, and to Canada and Japan.

An important result expected from the embargo is the diversion of some ocean shipping to trade with the Allies instead of neutrals. Observing the statistics of vessels cleared from the United States in the ten months ended April, 1916, and the similar period ended last April, it is rather significant that the tonnage of vessels embarked for Denmark and the Netherlands has materially increased. Spain is

another European neutral, and the tonnage for Spain decreased 28 per cent. The only certain difference is that Spain is not contiguous to Germany.

Apart from the questionable vessel movement between the United States and neutrals contiguous to Germany, the shipping statistics show clearly the large vessel tonnage that in the exigencies of war can be diverted to carrying our goods to our European Allies. The following figures represent the net vessel tonnage cleared from the United States in ten months' periods:

American Foreign .													14	1,0	91	6	673	Ended April, 1917 15,127,132 27,414,270
Total													41	R	10	1	423	42 541 402

Thus the foreign vessel tonnage slightly decreased, but the total increased, by reason of the large increase in vessels of American registry. A comparison of figures for April alone, 1916 and 1917, shows the same trend: The distribution of the tonnage was approximately as follows: Europe, 37 per cent.; North America, 51 per cent.; South America, 5 per cent.; other continents, 6 per cent. The clearings for North American ports, of course, represent a large percentage on account of the shortness of the trip. It is evident, however, that there remains quite a good supply of vessel tonnage for carrying supplies to our Allies in Europe.

Price Fixing and Maximum Output

In every boom in the American iron trade, assuccessive high prices were reached additional capacity has been brought into operation which could only become active under high-pressure prosperity. That is just what has been happening under the soaring war prices for steel and pig iron in the past year. But the basic facts in such a wheeling into line of the least fit of the country's iron and steel producers is apt to be overlooked in such an attempt as is now being made at Washington to regulate war-time prices on the basis of the costs of large producers. It has been the history of every iron trade boom that just as each new height in the ascent of prices automatically brought in more high-cost capacity, the reverse operation set in when the break came, the less fit furnaces and rolling mills dropping out as prices fell.

The fixing of prices materially lower than the level to which war demand has pushed iron and steel products would tend to produce, in the midst of war prosperity, the very effect which has been so familiar in the natural reaction from every trade boom. Production at low cost works would continue in full volume, but works with the highest cost would be forced out, at least until readjustment had worked down the line of labor and raw material costs.

Whether Congress gets under the load or whether it is put upon the President, added to the heavy burdens he now carries, or delegated to those he might appoint, price fixing in the present crisis is the greatest economic problem with which any government has been called on to deal. Unreasonable prices must not be paid for what is required to carry on the war, but at the same time there must be no impairment of the country's financial or industrial power, and every resource of production must be kept at the highest pitch. Eagerness to make a record for "saving" so many million dollars -saving it by taking from one class of producers profits which would come to them in an unregulated and hence competitive market-can bring prices down effectively, but the advantage would be dearly bought if output were lessened and further increase in steel-making capacity at the high prices that must now be paid for such increases were pre-

Great Britain got behind her steel industry in many cases to the extent of making enormous advances for the building of new capacity at high level war prices. To-day contracts for new openhearth steel works in this country represent in some cases three times the amounts paid for like capacity early last year. Yet all such building carries the risk of having a surplus of high cost blast furnaces and steel works after the war. The British Government has taken that risk in large measure in building up steel capacity there from 7,500,000 tons a year to over 10,000,000 tons a year, with 12,000,000 tons to be reached by another year, so that "control prices" for British steel do not represent anything like the "saving" that appears on their face.

It is vastly more important that the steel industry be stimulated to the largest possible output than that a certain number of dollars be taken by the Government from the prices which manufacturing consumers are paying in the open market. There is no question that \$4 is an exorbitant price for sufficient ferromanganese for the manufacture of a ton of steel; but it took an exorbitant price for ferromanganese to stimulate manganese mining in the United States to the point of making possible an 80,000-ton output for 1917, whereas before dependence on outside supplies was complete. The manganese situation is not paralleled in the market for finished steel, it is true, but it forcibly illustrates the point that the fixing of prices in war time, using prices before the war as a basis, is highly charged with possibilities of industrial derangement.

There is little need to argue for some form of regulation of iron and steel markets in view of the runaway condition apparent in the past three months. Producers are fully alive to the dangers of excessive prices. But as between direct action of Government authorities and action by the pro-

ducers under Government sanction, the former has decidedly more possibilities of harm. It is to be expected that mistakes will be made in the conduct of the war, but a dictatorship in so important a matter as iron and steel values is a monumental mistake that would do far-reaching and incalculable harm.

New Leadership Needed

When a man becomes obsessed by the belief that a large percentage of the people of this country is being willfully and maliciously oppressed in a manner akin to the oppression which has disgraced some of the autocracies of the old world, he is in danger of getting a distorted view of events at home and of seeming to align himself in sympathy with the worst forms of law-breakers. This was illustrated last week at Carnegie Hall, New York, when at the reception to the Russian mission Theodore Roosevelt and Samuel Gompers engaged in a controversy in regard to the recent race riots in East St. Louis.

While the reception was not the place for discussing the sins of omission or commission of any Americans, Col. Roosevelt expressed the opinion of a vast majority of his countrymen when he declared that, whether there was provocation or not, the race riots were waged with such appalling brutality as to leave a stain on the American name. On the other hand, Mr. Gompers, in this case as sometimes in the past, came very near to apologizing for crime. While he expressed detestation of all brutal conduct, Mr. Gompers asserted that "the luring of these colored men to East St. Louis is on a par with the behavior of the brutal reactionary and tyrannous forces that existed in Russia.' No wonder this assertion was vigorously denounced by Col. Roosevelt, who said that "the riots took place in a northern State where the whites outrank the negroes twenty to one" and that "if in that State the white men can't protect their rights by their votes against an insignificant minority, and have to protect them by the murder of women and children, then the people of the State which sent Abraham Lincoln to the Presidency must bow their heads."

The facts are that the negroes were not "lured" to East St. Louis or induced to go there by any promise that was not fulfilled. There was a demand for labor which, five or six years ago-long before the strikes of the past few months-caused negroes to move from the South to East St. Louis, where they earned much higher wages than they had ever been paid in their old homes. They sent word to their friends in the South that they had found a place where they earned wages higher than they had ever dreamed of. Naturally the migration increased rapidly, and in the course of time trouble arose between whites and blacks for various reasons; but there was absolutely no justification for the riots nor had Mr. Gompers any for the attitude he took in his controversy with Col. Roosevelt.

Since the United States entered the great war Mr. Gompers has occupied a high position in the councils of the nation and frequently his influence has been for the best interests of the country. Much that he has done in opposition to the plans of labor agitators has been admirable.

but now and then the old Gompers—the Gompers who defended the dynamiters and accused their prosecutors a few years ago, the Gompers who a few months ago declared that he would defy law and courts if his ideas of the rights of railroad employees were not upheld—appears and exercises a malign influence, showing the imperative need of wiser leadership of workingmen, leadership which will uphold law always and never apologize for crime.

The Stimulus to Manganese Mining

A predicted output of nearly 80,000 tons of high grade manganese ore in the United States this year, or nearly nine times the 1915 production, moves Secretary Lane of the Department of the Interior to say that "the manganese situation in this country is most encouraging and that this output, which is less than 20 per cent of the present large demand of the steel industry, is simply another expression of how America is meeting the present crisis in American fashion."

But the steel industry's actual needs in manganese ore for 1917, if all the ferromanganese were made in this country, would be not less than 775,000 to 800,000 tons. Thus the expected domestic output this year is only about 10 per cent of the amount necessary, instead of approximately 20 per cent, or not much more than enough to run the country's steel industry for one month. Our present consumption is about 28,000 tons of ferromanganese per month, requiring 70,000 tons of ore to make it.

While insignificant as compared with the total requirements, this unusual domestic production is a welcome acquisition to the country's imports of manganese ores and metals. We are not so sure that Secretary Lane has rightly judged in saying that this result is largely due to "better financing and better engineering of the industry." It is rather due to the fact that ferromanganese brings in the market to-day a price about ten times that which prevailed before the war. The pockety deposits in various parts of the country would have lacked neither financing nor engineering years ago, with a submarine war to make the price.

Sulphur in Steel Castings

Apparently taking the view that sulphur, even in a small percentage, is detrimental to steel castings, the Navy Department has decided to manufacture such castings for itself by the only process on a small scale which will regularly insure low sulphur content. It will also use this process for making some of its own projectiles at its new plant at Charleston, W. Va. As announced last week, the Department is about to install six 6-ton electric furnaces at various plants, of which some are now using the converter process for small castings. The Canadian Government some months ago gave orders for electric furnaces but on a larger scale.

The most recent specifications of the Navy for steel castings, as given on another page, call for a sulphur content of not over 0.05 per cent in all grades but one. In some former specifications this limit was 0.07 per cent. It is known that a

0.05 per cent limit is impossible to meet in many cases, and it is also acknowledged that not infrequently the rule has been waived so that producers could furnish the Government with the castings desired. This has been true particularly in recent months when producing conditions have been such as to increase rather than lower the sulphur content of steel. The Navy itself, in all probability, has been unable to meet its own specifications on small castings.

Evidently as a result of the Navy's move to make its own castings by the low sulphur process, there has been a sudden demand by other producers for electric furnaces for the same purpose—a demand so great that it has been impossible by one large electric furnace interest to meet it. Whether sulphur is actually detrimental to steel is a disputed question. In steel castings there is always the chance that it may be, because of cracks due to red shortness—defects which can only be partly removed by welding. In any case, the development referred to is another evidence of the growing commercial importance of electric steel which is advancing by remarkable strides in the United States and England.

Decrease in Steel Corporation's Orders

The United States Steel Corporation's monthly statement shows unfilled orders on its books as of June 30 of 11,383,287 tons, which is a decrease of 503,304 tons from those reported May 31. The June report is the smallest since last November, when the total on Nov. 30, 1916, was 11,058,542 tons. It is, however, over twice the unfilled orders for the corresponding month in 1915, when they were 4,678,196 tons. The following table gives the unfilled tonnage at the end of each month from January, 1914:

							1	9	1	7				1915	1914
January		0	0	. 1	1	. 1	1	14	,1	0	5	4	7,922,767	4,248,571	4,613,680
February .				. 1	1		5	76		6	9	7	8,568,966	4,345,371	5,026,440
March													9,331,001	4,255,749	4,653,825
April				. 1	2	,]		33		0	8	3	9,829,551	4,162,244	4,277,068
May	 			. 1	1	. 1	8	38		5	9	1	9,937,798	4,264,598	3,998,160
June				.1	1		3 !	33		2	8	7	9,640,458	4,678,196	4,032,857
July	 												9,593,592	4.928,540	4.158,589
August	 												9,660,357	4,908,445	4,213,331
September											٠		9,522,584	5,317,618	2,787,667
October	 											0	10,015,260	6,165,452	3,461,097
November													11,058,542	7,189,489	3,324,592
December													11,547,286	7.806.220	3 8 3 6 6 4 3

Iron and Steel Dictatorship Not Likely

Washington, July 11 (By Wire).—So much opposition has developed in the Senate to the provisions of the food control bill giving the President power to regulate the manufacture and distribution of iron and steel, copper, lead and other commodities that the Committee on Agriculture has decided to recast the bill and is now at work upon a substitute draft. This will be reported to the Senate as soon as completed and taken up in place of the measure now under consideration, which was fully described in The Iron Age last week. There is a fair prospect that iron and steel and other metals will be excluded from the new draft.

Large Decrease in British Exports of Sheets and Tin Plates

The extent to which the export business of Great Britain in galvanized sheets and tin plates has declined since the war is shown by the following table, all in gross tons:

To May 1, 1917	nized Tin Black ets Plates Sheets 50 60,328 4,614 447 116,379 69,570 197 130,622 12,554
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The average value of galvanized sheets per ton in 1915 was \$64.10; for 1916, \$118.63, and for 1917, \$121.91.

EXCESSIVE NEGRO MIGRATION

Illinois State Council of Defense Warns Against Artificial Movement of Population

Samuel Insull, Chicago, chairman Illinois State Council of Defense, following the recurrence of the race riots in East St. Louis, Ill., which resulted in the loss of many lives and the destruction of much property, ordered the printing and distribution in pamphlet form of a report based on an investigation which the council had made of conditions in East St. Louis. One of the conclusions reached by the investigators was that the migration of any class from one part of the country to another should follow natural lines. part the report says:

'The information obtained establishes that the riots were due to the excessive and abnormal number of negroes then, and for some months past, in East St. Louis. The feeling against the colored people originated in two sources-social and labor. There was resentment that the colored people, having overcrowded their quarters, were spreading out into sections of the city regarded as exclusively the precincts of the white The colored men, large numbers of whom had been induced there and who could find no jobs in their desperate need were preventing desired improvements being made by labor and threatening the existing standards of labor, and the white men were resenting it. * *

"It was alleged that employers had had meetings to arrange a program of importation of the Southern negroes, and that the larger employers of the city had collectively been responsible. The managers of all the larger industries of the city were examined, and all denied any collusion, or knowledge of the campaign conducted in the South to bring negroes to East St. Louis. The fact remains, however, that these managers were the chief beneficiaries of the surplus of labor, and the force of motive points in their direction."

Publicity the Cure

The council's committee on labor made these recommendations:

"1. That the widest publicity be given to the situation at East St. Louis through the Council of National Defense, and through the respective State councils of defense, that the danger in the situations of this kind may be made apparent to the South and the industrial centers of the North, to the end that migration of the Southern negroes may be discouraged before other outbreaks of a similar nature occur.

"2. That migration of any class from one part of the country to another be allowed to flow along natural lines that the equilibrium of population may not be disturbed; that the severest condemnation should be visited upon those who undertake to promote any artificial movement of population, because such artificial movement is sure to result in friction, and now more than

ever should friction be avoided.

"3. That the problems of shifting labor where labor is needed during the war be handled by the various State councils of defense, in conjunction with the Council of National Defense, in connection with those responsible officers of the labor movement who are daily showing their patriotism in endeavoring to restrain industrial strife, and in connection with the Department of Labor of the United States and similar departments of the States. It is anticipated that if this is done that labor can be shifted to where it is needed with sole reference to the benefit of industry as well as the workers themselves, and consequently to the welfare of the nation."

The Nagle Steel Co., Pottsville, Pa., has commenced operation of the new plate mill formerly used by the Potts Brothers Iron Co. The plant has been remodeled and rebuilt for the company's requirements. This is the fourth plant now operated by the Nagle company, the others being located at Glasgow, near Pottstown, Seyfert, Pa., and Rahway, N. J.

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Will Build Large Plant

PITTSBURCH, July 11 (By Wire).-The National Tube Co. of Pittsburgh has started work on the erection of a large plant at its by-product coke ovens at Lorain, Ohio, for the production of benzol and toluol.

Steel Exports to Be Controlled July 15

How Licenses Are to Be Obtained— The Question of Plates for Japan—Allies Purchasing Commission to Be Organized

WASHINGTON, July 10 .- The exportation of the most important products of the United States, including leading items of iron and steel, will pass under Government control on July 15, pursuant to a proclamation just issued by the President in accordance with the terms of the recently enacted espionage law. Every shipper of the commodities listed by the President will be required to obtain a license and his application therefor will be passed upon by the Exports Council or its representatives. No more sweeping innovation in the exercise of governmental authority has occurred since the declaration of a state of war with Germany, and as the objects sought to be attained are manifold and of a far-reaching consequence to the trade of the world, the development of the Council's policy will be awaited with the liveliest interest by producers and consumers alike in all the affected trades.

Iron and Steel Products Listed

By the terms of the President's proclamation licenses will be required for the exportation of coal, coke, fuel oils, kerosene and gasoline, including bunkers; food grains, flour and meal therefrom; fodder and feeds; meat and fats; pig iron, steel billets, ship plates and structural shapes, scrap iron and scrap steel; ferromanganese; fertilizers; arms, ammunition and explosives.

The objects of the control of these producers are three-fold: first, to conserve the supplies of these commodities for the consumers and the industries of the United States; second, to prevent these articles from finding their way to the common enemy; and third, to secure the equitable distribution among the Allies of the United States in the war with Germany of any surplus not needed in this country. Up to the present time the Government has developed no altruistic plans with reference to supplying neutral nations with these commodities and the flow thereof to such nations will depend almost wholly upon the war necessities of the United States and the Allies, and, to a very slight extent only, upon the commercial demand.

Plates to Japan May Be Checked

The correspondent of THE IRON AGE is in a position to state briefly the purposes of the Exports Council with relation to shipments of steel products in so far as they have been formulated. Exporters will probably be able to secure licenses for the shipment of the specified iron and steel commodities to the Allies with very little difficulty, except that the Exports Council may seek to check somewhat the heavy shipments of plates and shapes to Japan for shipbuilding purposes. In passing on applications for licenses for plates and shapes the council will keep constantly in mind the requirements of American shipyards for the construction, not only of those vessels of the Emergency Fleet Corporation already projected, but also those contemplated in the expanded policy of the United States Shipping Board described in another column and involving at least two million tons additional of steel and wooden ships.

Germany Getting Iron From Neutrals

Applications for licenses to ship the specified steel commodities to neutral countries contiguous to Germany will be rigorously inspected with the chances always against favorable action by the council. Official reports received within the past few days from special agents

abroad indicate that the Central Powers are receiving from neutral countries, and especially from Sweden, very large quantities of materials that go directly into the manufacture of munitions. Iron ore shipments from Sweden to Germany are said to have reached a total of 9,000,000 tons in the last two years, all of it of a grade required in the production of fine steel. This quantity is equal to Sweden's entire export of iron ore under normal conditions. During the three months ended March 31 of the present year Sweden imported from the United States 16,000 tons of pig iron and at the same time sold a large quantity of her own product to Germany. The official reports state that during the past two years Germany's imports of pig iron from Sweden have aggregated 250,000 tons, in addition to which Sweden has supplied the Teutonic Allies with 15,000 tons of ferrosilicon and ferromanganese, together with large quantities of manganese, copper, zinc and other metals and ores.

Whether exports of the specified iron and steel products to neutral countries contiguous to Germany will be absolutely interdicted has not been determined, but the Exports Council is greatly interested in the information it has received that in Sweden, for example, more than 600,000 tons of merchant shipping are held in port and are thus withdrawn from the merchant tonnage available for the transportation of supplies to the Allies. It is conceivable that the liberation of this interned tonnage may be the price which the Exports Council will put upon the further shipment of iron and steel to Sweden, although under no circumstances would it be the policy of the council to permit to be shipped to Sweden or any other neutral contiguous to Germany any considerable quantities of iron and steel that might find their way to the Central Powers.

Exports Under Existing Contracts

The probability of favorable action upon an application for a license to ship the specified iron and steel products to neutral nations not contiguous to Germany, as, for example, to South America, will depend upon special conditions peculiar to each case. It will be the policy of the Exports Council at the outset to permit shippers to fulfill outstanding contracts, provided they have not been entered into since the Government first gave notice of its intention to take over the control of the export trade. The size of shipments constitute an important factor, as the Council will not consider it advisable to interfere with small transactions, having in mind the larger question of supplying the needs of the United States and the Allies which would not be affected to any material extent by the diversion of small amounts of any of the controlled commodities.

Allies' Purchasing Commission

It is believed that one of the first effects of the President's proclamation will be the organization in London of the projected International Purchasing Commission representing all the Allies. This commission will have for its chief concern the buying and distribution of wheat and other food products, but presumably it will ultimately take over the purchasing of all articles for national use or for distribution by governmental agencies. It is expected that the commission will speedily designate a representative in the United States to act in conjunction with the Joint

Purchasing Commission which the President for some weeks has contemplated appointing to take over the work of buying for the Government, now in the hands of the Council of National Defense. The rapid developthe Council of National Defense. ment of the war situation, with its thousand and one ramifications calling for immediate cosideration, has made such drafts upon the President's time that his selection of the Purchasing Commission and the reorganization of the Council of National Defense have been deferred from week to week, but will probably be effected in the near future.

How to Get Licenses

Secretary of Commerce Redfield has made the following announcement with reference to the procedure to be adopted by exporters in the United States in applying for export licenses:

1. Applications for licenses may be made by the Bureau of Foreign and Domestic Commerce, Division of Export Licenses, 1435 K Street, Washington, D. C., or to any of the branches of the Bureau of Foreign and Domestic Commerce—New York, Boston, Chicago, St. Louis, New Orleans, San Francisco, and Seattle.

In applying for a license to export any of the com-modities covered by the President's proclamation, appli-cants should give the following information in triplicate form:

b.

Description of goods.

Name and address of consignee.

 d. Name and address of consignor.
 3. The license will be good for only 60 days and at the expiration of that time must be renewed, and if not shipped within that time a new application must be

4. The various branch offices of the Bureau of For-eign and Domestic Commerce have been given full in-structions as to the disposition of all applications for

licenses.

It is the desire of the Bureau of Foreign and Domestic Commerce to minimize the exporter's difficulties as much as possible, and therefore wherever practicable the district offices will be authorized to issue the licenses. It is thought, however, that many of the applications may have to be forwarded to Washington for decision. In case exporters desire, they may telegraph their applications direct to the Bureau of Foreign and Domestic Commerce, Division of Export Licenses, 1435 K Street, Washington, D. C.

The Exports Council has prepared the following blank form of application for export license:

Application Form A

APPLICATION FOR ORDINARY EXPORT LICENSE

This form should be made out in triplicate, and the answers the following questions must be written legibly, or typewritten if possible. When filled out and signed, send the three copies to the Bureau of Foreign and Domestic Commerce, Division of Export Licenses, 1435 K Street NW., Washington, D. C., or to the nearest branch office of the Bureau (New York, Boston, Chicago, St. Louis, New Orleans, Sen Experience, Senttle). San Francisco, Seattle)

Applicant's reference No.... Bureau of Foreign and Domestic Commerce, Division of Export Licenses, I hereby apply for a license to export..... (quantity)

(goods) (consignee) (address) (Signature of applicant) deense to be sent to.....

(address) THIS LICENSE IS VOID AFTER SIXTY DAYS FROM DATE.

(name)

An Advisory Board will have general supervision of the scrutiny and issuing of export licenses. This board, which will relieve members of the Exports Council of details, has just been appointed and is as follows: Edward N. Hurley, former chairman of the Federal Trade Commission, representing the Department of Commerce; Vance C. McCormick, representing

the State Department; Dr. Alonzo E. Taylor of the University of Pennsylvania, representing the Department of Agriculture; B. D. White, representing the food administration, and Dr. E. E. Pratt, chief of the Bureau of Foreign and Domestic Commerce, as secretary. It is probable that a representative will be named later from the Shipping Board.

Whatever policy the Exports Council may adopt with respect to the distribution of the iron and steel products covered by the President's proclamation, there is no present basis for the statements published in the daily press to the effect that an attempt will be made, through the control exercised by the council, to dictate the prices at which exported commodities shall be sold. The question as to whether the Allies shall be enabled to buy American products at the same price at which they are sold to the Government of the United States is an important one which will have to be met in the very near future; but the council does not regard it as germane to its two chief functions, viz., the conservation of the American supply for America and the prevention of indirect shipments to the enemy.

Investigation of Coal Prices

The Federal Trade Commission announces that its report upon the cost of producing bituminous coal, which is to serve as a basis for Government purchases, will be completed in about ten days. The inquiry having been undertaken at the instance of President Wilson, the report will be made direct to him and will not be forwarded to Congress unless the President decides that such a course is advisable. The commission calls attention to the fact that it has no power to fix prices and that it will confine itself to a statement of facts regarding costs, leaving it to the purchasing departments to negotiate such contracts as are now in prospect. Pending the commission's report, the coal producers will continue to supply the general public with run-of-mine coal at the basic price of \$3 f. o. b. the

The investigation of coal prices by the Senate Committee on Interstate Commerce may result in action by the Department of Justice, according to Senator Pomerene of Ohio, a prominent member of the committee. As the result of developments in and out of the committee, Senator Pomerene declares that criminal methods have been employed by large coal operators which have resulted in running coal prices up from \$1.10 per ton f.o.b. the mines to as much as \$9.25 to consumers. Thousands of cars loaded with coal have been held in freight yards, he asserts, while prices were raised, and in some cases the operators were perfectly willing to pay demurrage charges because these charges were offset by greater profits resulting from the detention of the cars. One coal company is said to have paid \$400 a week in demurrage bills, but to have secured an extra profit of \$1,600 by holding up shipments.

The Railroads' War Board, which has been working

in conjunction with the coal producers and Council of National Defense not only to expedite coal shipments, but to relieve the general transportation situation, has issued a bulletin announcing that the car shortage has been substantially reduced by increasing the loading of freight cars and by following closely other requirements of the recently promulgated regulations.

W. L. C.

In line with the President's proclamation relative to the duty of all power plant operators to conserve fuel, the Combustion Engineering Corporation, New York has assigned one of its efficiency engineers to the work of traveling through the country to interview chief engineers and owners of such plants, with a view to reducing the fuel costs by increasing efficiency in every way possible not only in so far as the above company's stoker is concerned, but in suggestions for minor improvements and changes which can be made at small expense.

Iron and Steel Markets

THE EMBARGO ON EXPORTS

No Important Effect Upon the Market

Steel Manufacturers in Conference at Washington
—The Government's Requirements

The effect on the domestic market of the Government embargo on certain iron and steel exports, effective July 15, will not be important, since exports of pig iron, steel billets, structural shapes, plates, ferromanganese and scrap to neutrals have been small. It seems likely that some restriction will be put upon exports of ship plates to Japan, as this movement has been considerable and plates are greatly needed for the ships building here.

There may be some reselling of export products now on the books, as in the case of pig iron for Sweden and Holland, but the volume will be even less than that represented in the resales of recent months, where vessel room could not be had for pig iron or steel that had been shipped to various seaports. There is no present basis for the published report that the Exports Council will use its control to dictate prices at which exported commodities shall be sold.

The latest development in Government price fixing on plates, shapes and other steel products is the calling of the American Iron and Steel Institute Committee to Washington to confer to-day (Wednesday) with the secretaries of War and the Navy and the chairman of the Shipping Board. The final word in the important negotiations affecting prices eventually on several million tons of steel products for the Government and its Allies may yet come from the President.

While a dictatorship of steel manufacture and distribution is less a possibility to-day than it appeared last week, the expectation of some form of price regulation, whether by the Government or by producers under Government sanction has grown to be the chief market influence. New business is less than in two years, both domestic and export transactions being held up by Washington negotiations.

Steel manufacturers' estimates of Government and Allies' total buying of steel products, expressed in terms of ingots, approximate 12,000,000 tons for the coming year, at the higher rate of shipbuilding now thought possible, or nearly 30 per cent of the country's present steel output. In plates and shapes the percentage taken for Government use is expected to go to 40 or 50.

A considerable addition to the 81,000 tons of shell steel recently placed by the Government is under negotiation. There are evidences also of the release of a large amount of business that has been awaiting Washington action. This applies to machine tools as well, shipyard purchases running into large figures.

Government demand for sheets has been an im-

portant factor in that market. Prices for No. 28 black and No. 10 blue annealed sheets are near to a parity around 8.75c.

Tin plate inquiries from abroad are accumulating. The Italian Commission, which recently placed 122,000 boxes, seeks 100,000 boxes more, and other export inquiries are for 84,000 and 100,000 boxes. Action on these as well as the general inquiry said to have come from Great Britain will depend on what Washington wants done.

Under present conditions manufacturers are making headway on their contract obligations, as illustrated by the reduction of 503,000 tons in the Steel Corporation's unfilled orders. Yet congestion at mills is still hampering operations, car supply showing no such improvement as might be inferred from the extensive co-operation of railroads and shippers.

In the pig iron market the feature has been the beginning of contracting covering the second half of 1918. The amount of such business is small, however, one Southern seller of foundry iron being a leader in the movement. Prices are irregular, the decision of some sellers to go \$2 farther into the fifties being apparently inconsistent with concessions on offerings of resale iron elsewhere.

Prices on steel-making iron vary. While sales of Bessemer iron are reported at \$57 and of basic iron at \$54, there have been offers of Bessemer at \$55 at Valley furnace. An inquiry in the Pittsburgh district is for 15,000 tons of basic iron for the first half of next year.

Prices on prompt blast furnace coke are steadily declining and \$13 is more common this week. A contract for 8000 tons a month for the last half of the year has been put through at \$10 at oven. Indications are that coke output and consequently pig iron output will show some increase in the second half of the year.

The scrap market is generally upset as the result of the past month's performances, and declines in heavy melting steel have been marked. The export embargo, the possibility of price regulation and other unsettling factors have brought dealings to a standstill in some markets.

Pittsburgh

PITTSBURGH, July 10.

The belief is general here that the embargo just declared by the Government against export shipments of pig iron, steel, scrap and some forms of finished steel is probably the best thing the Government has done since the war broke out. It is understood here that this embargo does not affect contracts already made for export shipments of iron and steel products, and it is said there are a fair number of these. The embargo means that thousands of tons of pig iron, plates, shapes, tin plates and other materials that were formerly being shipped to neutral countries will now be kept at home, and be available for our domestic manufacturers. There is a strong feeling that large quantities of food stuffs, also finished steel products, that the United States was shipping to neutral countries eventually found their way into Germany and this will now be absolutely cut off. Conditions in the local pig-iron and steel market

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

l'ig Iron, Per Gross Ton:	1917.	1917.	1917.	July 12, 1916,	Sheets, Nails and Wire,	July 11, 1917.	1917.	1917.	1916.
No. 2 X, Philadelphia	55.00	\$52.00 55.00	\$42.50 42.00	\$19.75 18.25	Per Lb. to Large Buyers :		Cents.	Cents.	Cents.
No. 2 Southern, Cin'ti	49.90	49,90	40.90	16.90	Sheets, black, No. 28, P'gh	8.50	8.50	6.50	2.90 4.50
No. 2, Birmingham, Ala.	47.00	47.00	38.00	14.00	Sheets, galv., No. 28, P'gh Wire nails, Pittsburgh.	10.00	10,00	3,50	2.50
No. 2, furnace, Chicago*.	55.00	55.00	42.00	19.00	Cut nails, Pittsburgh	4.65	4.65	3.75	2.60
Basic, del'd, eastern Pa Basic, Valley furnace	50.00 53.00	50.00 52.00	38.00 42.00	19.00	Fence wire, base, P'gh	3.95	3.95	3.45	2.45
Bessemer, Pittsburgh	57.95	57.95	44.95	18.00 21.95	Barb wire, galv., P'gh	4.85	4.85	4.35	3.35
Malleable Bess., Ch'go	55.00	55.00	42.00	19.50	011.11				
Gray forge, Pittsburgh.	47.95	47.95	40.95	18.70	Old Material, Per Gross T	on:			
L. S. charcoal, Chicago	58,00	57.00	46.75	19.75	Iron ralls, Chicago	\$45.00	\$47.00	\$32.50	\$18.50
					Iron rails, Philadelphia	52.00	52.00	34.00	20.00
Rails, Billets, etc., Per Gr	ross Ton				Carwheels, Chicago Carwheels, Philadelphia.	37.00	37.00 38.00	24.25 27.00	16.00
Bess. rails, heavy, at mill		38.00	38.00	33.00	Heavy steel scrap, P'gh.	40.00	42.00	28.00	16.50
Oh. rails, heavy, at mill		40.00	40.00	35.00	Heavy steel scrap, Phila	40.00	40.00	25.00	15.00
Bess, billets, Pittsburgh		100.00	80.00	40.00	Heavy steel scrap, Ch'go.	34.00	36.00	27.00	14.00
Oh. billets, Pittsburgh		100.00	80.00	42.00	No. 1 cast, Pittsburgh No. 1 cast, Philadelphia.	34.00 37.50	36.00	24.00 28.00	15.75
Oh. sheet bars, P'gh Forging billets, base, P'gh		105.00	80.00	42.00 69.00	No. 1 cast, Ch'go (net ton)	29.50	30.50	21.50	11.50
Oh. billets, Phila		110.00	75.00	45.00	No. 1 RR. wrot, Phila	55.00	57.00	41.00	19.50
Wire rods, Pittsburgh		95.00	85.00	55.00	No. 1 RR. wrot, Ch'go (net)	39.00	40.00	31.00	14.25
					Coke, Connellsville, Per N	let Ton a	t Oven:		
Finished Iron and Steel,					Furnace coke, prompt		\$15.00	\$7.50	\$2.75
Per Lb. to Large Buyers ;	Cents.	Cents.	Cents	Cents.	Furnace coke, future		9.50	7.50	2.50
Iron bars, Philadelphia.	4.659	4.659		2.659	Foundry coke, prompt		13.00	8.50	3.25
Iron bars, Pittsburgh	4.75	4.75	3.75	2.50	Foundry coke, future	10.00	10.00	9.00	3.50
Iron bars, Chicago Steel bars, Pittsburgh	4.50	4.50	3.25 4.00	2.35	36-1-3-				
Steel bars. New York	4.669	4.669		2.75 2.669	Metals,				
Tank plates, Pittsburgh	9,00	9.00	6.50	3.50	Per Lb. to Large Buyers	Cents.	Cents.	Cents.	Cents.
Tank plates, New York	9.169	9.169			Lake copper, New York	30.75	31.75	31.00	26,00
Beams, etc., Pittsburgh Beams, etc., New York	4.50	4.50 4.669	4.419	2.50 2.669	Electrolytic copper, N. Y.		31.75	31.00	25.75 8.75
Skelp, grooved steel, P'gh	4.00	4.00	3.50	2.35	Spelter, St. Louis Spelter, New York			9.121	
Skelp, sheared steel, P'gh	6.00	6.00	5.50	2.45	Lead, St. Louis	11.00	11.25	10.25	6.25
Steel hoops, Pittsburgh	5.25	5.25	4.25	2.75	Lead, New York	11.123	11.373	10.45	6.45
ermbe a verse and to the	hanne f	an delle		andulas to	Tin, New York	63.00	62.00	59.37%	
*The average switching c		or delive	ry to to	undries in	Antimony (Asiatic), N. Y. Tin plate, 100-lb, box, P'gh.	212.00	\$12.00	25.00 \$8.50	15.50 \$6.00
the Chicago mounted is not.	fret cont.				rin plate, 100-10. box, F gh.	612,00	412.00	00.00	00.00

in the past week were very quiet, and very little material is being sold. Furnaces and steel works, also finishing mills, are afraid to make contracts for forward delivery, until it is known definitely just what the Government will do and on the other hand consumers are not anxious to contract under existing conditions, with the result that new business being booked by the mills at present is slighter than at any time in two years. Shipments are showing a heavy increase over new orders being booked, but how long this condition will last is a question. Once the Government gets active in placing contracts for war materials, they will take preference over domestic orders and the mills will bend their entire energies to get out the Government orders at the very earliest moment possible. Price changes in the past week have been light, basic iron being up \$1 to \$2 per ton and some sellers are asking \$60, Valley, for Bessemer, but we do not hear of any sales yet at that extraordinary price. There is a scarcity in the supply of both Bessemer and basic and higher prices are not unlikely. There has been a decline in prices of prompt furnace coke, fairly large sales to-day (Tuesday) having been made at \$13 to \$13.25 at the ovens. Scrap is in a decided slump, and prices have again gone off \$2 to \$5 per ton.

Pig Iron.—The pig-iron committee, of which C. D. Dyer, vice-president of the Shenango Furnace Co., is chairman, will take charge of buying of pig iron for the Government and distributing its orders among the furnaces. As yet, nothing definite has been done with the inquiry of Italy for 60,000 tons of Bessemer iron or with the Government inquiry for 10,000 tons of foundry iron. A local committee, of which T. W. Friend is chairman, has been appointed to handle the inquiry from the Italian Government for 60,000 tons of Bessemer iron, but this committee has done nothing definite. The two largest inquiries in the market for basic iron are from the Whitaker-Glessner Co., Wheeling, W. Va., and from the Erie Forge Co., Erie, Pa., each concern wanting

10,000 tons for first half of next year, but nothing definite has been done with either inquiry. In fact, actual sales of Bessemer and basic iron are for small lots only, it being very difficult to find any large lots for the open market. We note a sale of 2000 tons of basic iron at \$54, 1500 tons of Bessemer at \$57, both at Valley furnace. It is said small lots of Bessemer have sold at \$58 at Valley furnace. We quote Bessemer iron at \$57 to \$58; basic, \$53 to \$54; malleable Bessemer, \$53 to \$54; No. 2 foundry, \$55 to \$58, and gray forge, \$47 to \$48, all f.o.b. at Valley furnace for delivery this year. The freight rate from Valley furnaces on pig iron to the Cleveland and Pittsburgh districts is 95c. per ton.

Billets and Sheet Bars.—The local markets on semifinished steel is very quiet, consumers being well covered on contracts and very little steel is available for the open market. For the present quarter, some large users of billets and sheet bars that have contracts with regular sources of supply are said to be paying from \$80 to \$85 per ton, for both billets and bars, but this is not official. It is probable that soft Bessemer or openhearth billets and sheet bars would bring \$100 to \$105 in the open market for fairly prompt shipment. Forging billets are very firm at \$125 to \$130 at mill.

We now quote soft Bessemer and open-hearth billets at \$95 to \$100 and soft Bessemer and open-hearth sheet bars at \$105 to \$110, maker's mill, Pittsburgh or Youngstown. We quote forging billets at \$125 to \$135 per ton for ordinary sizes and carbons, f.o.b. maker's mill.

Ferromanganese.—The new inquiry for ferromanganese is quiet, consumers apparently being covered on their entire needs for the present quarter and some over the remainder of this year. For delivery over last half of this year we quote 80 per cent domestic ferromanganese, \$400 to \$425, and for first half of next year about \$350 per gross ton at maker's furnace. There seems to be an ample supply of ferromanganese to fully meet the needs of this country in making steel. Small lots of 50 per cent ferrosilicon for spot shipment are still

being sold at prices ranging from \$225 to \$300 delivered. We quote 18 to 20 per cent spiegeleisen at \$80 to \$85 per gross ton, at furnace. Consumers of Bessemer ferrosilicon and silvery iron are covered over this year, and the new demand is light.

We quote 9 per cent Bessemer ferrosilicon at \$89, 10 per cent \$90, 11 per cent \$95, 12 per cent \$100, 13 per cent \$105, 14 per cent \$115, 15 per cent \$125, and 16 per cent \$135. We now quote 7 per cent silvery iron at \$51 to \$52, 8 per cent \$52 to \$53, 9 per cent, \$54 to \$55, 10 per cent \$55 to \$56, 11 and 12 per cent \$57 to \$58. All f.o.b maker's furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of \$2 per gross ton for delivery in the Pittsburgh district.

Steel Rails.-No new orders are being placed for standard sections, but the new demand for light rails is very active and they are hard to obtain. The two makers in this district are sold up on light rails for a year or more, but the Cambria Steel Co. occasionally takes some new orders to be filled at convenience of the mill. Sales of rerolled light rails have lately been made at prices higher than are being quoted on new light rails. Prices on new light rails and on standard section are given on page 107.

Structural Material.-Most of the new business being placed in structural shapes is coming from the Government, and information on these contracts is not avail-The new inquiry from the domestic trade is light, due to the very large falling off in new building operations on account of the high prices ruling for steel and labor and also on account of the uncertainty of the fu-The American Bridge Co. is turning out very large quantities of structural material for the Government, and the McClintic-Marshall Co. has also taken on some large Government work.

Plates.-The local mill that has been furnishing some considerable plates to the Government for some time expects in the near future to roll about 50,000 tons of plates per month for the Government and the quantity may be larger. It is said that before long the Government will be taking about 50 per cent of the entire output of the plate mills, and this means there will be fewer plates for large consumers, such as the steel car builders, boiler shops and for other work. ard Steel Car Co. has taken 250 steel gondolas for the Phelps Dodge Co. and 250 tank cars for Swift & Co. Some small inquiries for steel cars are in the market, these including 100 flat cars for the Florida East Coast Line and 40 steel hoppers and 15 steel gondolas for the Benwood & Wheeling Connecting Railroad. We quote ¼ in. and heavier sheared plates at 9c. to 10c. at mill for delivery late this year, while small lots from warehouse for fairly prompt delivery bring 11c. to 12c. and higher. Mills are quoting 10c. to 12c. on ship plates to domestic The above prices apply only on domestic shipyards.

Sheets.—The Government demands for all grades of sheets are getting heavier right along, there having been a large increase in direct orders for sheets being placed by the Government and also in indirect business from concerns that are making products for Government use. On Tuesday each week the sub-committee on sheets meets in this city and makes up a schedule distributing Government orders to the different mills. It is estimated that the Government requirements of sheets for the remainder of this year may run close to 150,000 tons. The distribution of sheets from the mills to domestic consumers is getting steadily less as the Government demands increase. Three or four of the largest mills have been practically out of the market as sellers for several months, trying to take care of Government business and regular customers as best they can. A sale of 500 tons of No. 28 gage Bessemer black sheets has been made by a Mahoning Valley mill at 8.75c., f.o.b. mill. Mill prices for carloads and larger lots over which premiums are being paid for fairly prompt shipment are given on page 107.

Tin Plate.—The embargo on bright plate instituted some time ago against packers of non-perishable goods has been partially removed and bright plate is now going forward in larger quantities to packers of nonperishable foods than at any time for several months. None of the tin plate mills actually have shut off shipment of tin plate to packers of non-perishable foods, but the quantities shipped were cut down very materially, and these customers will now get more plate. Be cause of the close co-operation of the tin plate mills with the Government, a full supply of bright plate for packing perishable foods this summer seems absolutely The foreign demand for tin plate is still very assured. heavy. The Italian Commission recently placed 122,000 boxes with American mills, of which one mill took 32,000 boxes, and several others 10,000 boxes each. Italian Commission is also in the market for 100,000 boxes more, and there is another export order in the market for 84,000 boxes. J. P. Morgan & Co. has an inquiry out for 100,000 boxes, and it is reported, but not officially confirmed, that England will need an immense quantity of tin plate, and hopes to get it in this However, on these foreign inquiries, Amercountry. However, on these foreign inquiries, America will refuse to quote unless directed to do so by our own Government. On current orders for tin plate, which are quite heavy, local mills are quoting \$11 to \$12 per base box. Nominal prices on terne plates the demand being dull, are given on page 107.

Iron and Steel Bars .- One local mill expects to be furnishing very shortly at least 5000 tons of steel bars per month to the Government, and the amount may be larger. The iron and steel bar mills are steadily restricting the percentage of output intended for mestic consumers, conserving more and more of their output for Government uses. The output of iron and steel bars for this year is practically sold up, and all the mills are very much back in deliveries. Prices on iron and steel bars being quoted by the mills in carloads and larger lots to regular domestic customers are given

on page 107.

Hoops and Bands .- Mills are largely sold up this year on both hoops and bands, and most orders now being placed are for small lots, for which very high prices are being paid. Steel hoops range from 5c. to 5.50c., and steel bands from 5c. to 6c. at mill, to regular customers only. It is said that in special cases, steel hoops have sold at 6c. and steel bands as high as 7c. at mill for fairly prompt delivery.

Muck Bar.—Best grades of muck bar made from all pig iron are quoted at \$95 to \$100 per gross ton, maker's mill.

Wire Rods.-Mills are drawing the lines together in regard to taking on new obligations for wire rods, and have practically stopped quoting on export inquiries. Small lots of soft Bessemer and open hearth rods have sold recently at \$95 to \$100 at maker's mill. There is a heavy demand for special quality rods made from special steel. Prices on these range from \$100 up to \$120, maker's mill. Prices on rods are given in detail on page 107.

Wire Products.-No further large orders for wire and wire nails have been placed by the Government, but more are expected to be given out soon. Three or four of the largest makers of wire and wire nails are not actively trying to secure new business, desiring to conserve more and more of their output for Government uses, and to take care of obligations already on their books for domestic customers. The fact that prices of the independent mills on wire and wire nails are \$16 above that of the leading interest is still causing some complication among the jobbing trade, mention of which has been made before in our reports. The export de-mand for wire and wire nails is still very heavy, coming largely from Japan, South America and other countries, but it is doubtful whether mills will quote in the future on very much of this export inquiry. A sale of a fairly large quantity of special analysis bright basic wire was recently made at close to \$200 per ton at maker's mill. Mills are back in deliveries on both nails and wire, and with the increasing demand being made on them for their product, still slower deliveries to the domestic trade seem likely. The American Steel & domestic trade seem likely. Wire Co. is still taking care of its domestic customers to the best advantage it can on wire nails on the basis of \$3.20 base, per keg, and on bright basic wire \$3.25 per 100 lb. Detailed prices on wire and wire nails, in effect by the independent mills are given on page 107.

Shafting.—The demand for shafting is only fairly heavy, and most large consumers are covered over the remainder of this year. Specifications from the screw stock machine trade and from implement makers are heavy, but from the automobile builders are light. It is expected, however, that the contracts, soon to be placed by the Government for army trucks and other vehicles will be reflected in a very much heavier demand from motor truck builders. Discounts on shafting are firm, ranging from list to 10 and 5 per cent off, depending on the quantity and the delivery wanted.

Railroad Spikes and Track Bolts.—There is a decided scarcity in the supply of spikes due to the fact that one or two makers are out of the market as sellers, while other makers who buy their steel outside are not getting more than 25 to 40 per cent of the quantity of steel they need. Prices of base sizes of spikes are firm at \$5, and on smaller sizes \$7.50 to \$8. There is a very heavy demand for boat spikes from the shipyards, and this will get much heavier as the boat building program of the Government gets into full swing. Prices on track bolts are also very firm, due to scarcity of supply and the heavy demand. Prices in demand on railroad spikes and track bolts are given on page 107.

Cold Rolled Strip Steel.—The direct demand from the Government for cold rolled strip steel and also the indirect demand from customers of the mills are getting steadily heavier. Owing to the uncertainty as the attitude of the Government makers of cold rolled strip steel are selling for delivery only 60 days ahead and still demand that 50 per cent of the specifications must accompany each order. On these contracts, the mills are still quoting 9c. at mill, but on small current orders for fairly prompt shipment prices range from 10c. up to 12c. at mill. Terms are 30 days, less two per cent off for cash in 10 days, when sold in quantities of 300 pounds or more.

Nuts and Bolts.—All makers report the new demand for nuts and bolts is very heavy, and much beyond their ability to supply promptly owing to the scarcity of steel, also of labor. The car supply is better and the heavy stocks of nuts and bolts held in warehouses awaiting cars for shipment are now moving out more freely. There is still a heavy export demand for nuts and bolts, but makers are turning these down as they desire to conserve their entire output for the Government and regular domestic customers. In addition, it is almost impossible to get cars and bottoms for export shipment. The discounts adopted on April 12 last are still in effect, and are given in detail on page 107.

Rivets.—Makers report the new demand fairly heavy, and most large consumers are covered over the remainder of this year. The supply of steel and labor is short, and this is cutting down output of rivets to a considerable extent.

Wrought Pipe.—There are now three distinct lists of discounts on the market, one of these being the card of the National Tube Co., adopted on April 2 with the basing discount 55 per cent, another being the discounts of May 1 adopted by the independent mills, which is 49 per cent and the third the lists of the Labelle Iron Works and the Wheeling Steel & Iron Co., The mills on which the basing discount is 42 per cent. that are quoting the lower discounts on steel pipe have been practically out of the market as active sellers, these concerns filling large orders for the Government, and also trying to take care of domestic customers as best they can. It is probable that within a very short time all the independent steel pipe mills will adopt the discounts now in effect by the Wheeling Steel & Iron Co., and the Labelle Iron Works, one or two mills having done so in the past week. On lap weld steel pipe, mills have nothing to sell for this year and several have practically their entire output sold up for first half of next year. The demand for oil country goods is extremely heavy, and heavy premiums over regular prices are being paid for fairly prompt delivery. Dis-counts on steel pipe as adopted on May 1, and on iron pipe as adopted July 1 by leading iron pipe mills are given on page 107.

Boiler Tubes.—Conditions in the boiler tube market are the same as have been noted in this report for some months past. The output of iron and steel tubes is sold up for a year or more ahead and on seamless steel tubing for a longer period. Discounts are purely nominal, and show prices much below what are actually being paid by consumers who can find any mills that have either iron or steel tubes to sell. Nominal discounts on iron and steel tubes as adopted Nov. 1, 1916, but which have been obsolete for some months, are given on page 107.

Old Material.-It is believed that the embargo declared by the Government against any further export shipments of scrap except by special permit will have a beneficial effect, as it will probably assure to domestic consumers all the scrap they need for their use. Not much scrap has been exported from the Pittsburgh district, but it is known that exports have been heavy from Eastern points at which large amounts of scrap originate. The prospect that the Government may soon take charge of scrap and regulate prices has practically stopped all new business. Dealers are afraid to sell, and consumers will not buy until it is known definitely just what the Government is going to do. Under this waiting attitude, prices naturally have gone lower to the extent of \$1 to \$3 per ton, depending on the grade. Selected heavy steel melting scrap has sold in small lots as low as \$40 per gross ton, delivered, and the market is none too strong at that figure. Low phosphorus is also lower in price, and borings and turnings have declined about \$1 per ton. Sheet bar crop ends have gone off more than any other grade of scrap, and are freely offered at \$47, or less, at shipping point. not likely there will be very much new business in scrap until the Government attitude is definitely known, and in the meantime, prices are likely to go off still more. New sales in the past week have been very light. We note a sale of about 200 tons of heavy melting steel scrap at \$40, and 600 tons of low phosphorus billet and plate ends at \$56 per gross ton, both delivered to consumers' mills. Dealers quote for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

Heavy steel melting scrap, Steuben- ville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered		to	\$42.00
No. 1 foundry cast			
Rerolling rails, Newark and Cam- bridge, Ohio, Cumberland Md., and	00.00		00.00
	43.00	10	45.00
Franklin, Pa.			
Hydraulic compressed sheet scrap	33.00	to	34.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mill, Pittsburgh			
district	26.00	to	27.00
Bundled sheet stamping scrap			24.00
No. 1 railroad malleable stock			34.00
Railroad grate bars			
Low phosphorus melting stock	56.00		
Iron car axles	55.00		
Steel car axles	57.00		
Locomotive axles, steel	60.00		
No. 1 busheling scrap			
Machine-shop turnings			
Old carwheels	37.00		
Cast-iron borings	21.00		
*Sheet bar crop ends	48,00		
No. 1 railroad wrought scrap			
Heavy steel axle turnings			
	31.00		
Heavy breakable cast scrap	91.00	10	02,00

*Shipping point.

Coke.-The total output of coke in the Upper and Lower Connellsville regions for the first six months of 1917 is given as 9,247,113 tons, a decrease over the first half of 1916 of 2,362,113 net tons. The main reason for this falling off in output was scarcity of labor and also cars, many plants having to shut down at different periods during 1917 for lack of cars, and also on account of shortage of labor. There was a heavy demand in the past week for blast furnace coke for prompt shipment, and sales were made at as high as \$16 per net ton at oven for best grades. However, the car supply in the last few days has been better, and prices of spot furnace and foundry coke are lower. Prices on prompt blast furnace coke are steadily declining, and on Tues day fairly large sales of high grade blast furnace coke for spot shipment were made at \$13 to \$13.25 per net ton at oven. One Valley blast furnace interest recently made a contract for about 8000 tons of blast furnace coke per month, delivery over last half of this year, at \$10 per net ton at oven. As long as the high prices of prompt coke were in force, there was no chance of any contracts being made, as producers preferred to sell their coke at the market, and name prices each day as they have been doing so far this month.

We now quote best grades of blast furnace coke for prompt shipment at \$13 to \$13.25, and foundry coke at \$14 per net ton at oven. Some time ago some large contracts for 72-hour high grade foundry coke were made at \$10 per net ton at oven, but none has been made lately. The Connellsville Courier gives the output of coke in the Upper and Lower Connellsville regions for the week ending June 30 as 371,168 net tons, an increase over the previous week of 9,507 tons.

Chicago

CHICAGO, July 9.

To uncertainty over the extent to which the Government will demand their products, and that created by the proposal to fix prices by Governmental means for the private consumer, is now added doubt as to how far the mills will be affected by Government control of The question arises as to how far the foreign orders already booked will be allowed to take their normal course. Japan has done some tremendous buying of plates, pig iron and rivets and bolts, to say nothing of other products. One interest expects that foreign orders may be filled if they do not interfere with Government needs. Others believe that the effect of the license system will be minimized by the lack of ships, this already having been a doleful feature of the export trade. It is generally believed that, if exports were curtailed or deferred, as they likely would be under the proposed regulation, the result would be of a stabilizing character, and this would be welcomed, even by who are supposed to be profiting most by existing conditions. It is predicted that an export embargo would operate to bring plates and sheets down to more reasonable levels. Pig iron is without change, except that the largest Southern merchant interest has practically withdrawn from the market for the first half of 1918, and opened its books for the last half of 1918. Structural material makes a better showing with six awards, though most of them are small. The Grand Trunk system has placed 1000 cars for use in the United States. Manufacturers of tie-plates have made sales of carload lots at \$90 to \$100 for prompt delivery. Not much business is in sight, but in the last six weeks one manufacturer has booked about 50 per cent of capacity. The Government demand for some extent by conditrend, but is being supported to some extent by conditions in the East.

Pig Iron.-In all quarters, new business is quiet, with efforts concentrated on making deliveries of iron under contract, especially where the prices involved were much lower than those which prevail to-day. Naturally, the buyers in these cases are anxious to get the iron in their yards, and their insistence that iron be shipped without further delay is based fully as much on fear that some untoward circumstance may intervene as on actual need. Their attitude may be understood from the fact that some Southern iron purchased at \$16.50 has lately been shipped. The market continues to change with great rapidity. On July 6 the leading Southern interest offered limited quantities for both last-half and first-half delivery, whereas to-day (July 9) it announces its withdrawal from the first half, and its willingness to consider orders for the last half of 1918 at \$48, Birmingham. In the last half of this year, some odd lots may be available, but for these offers must be submitted to the furnace. Southern No. 2 foundry would be difficult to find under \$50, Birmingham, or \$54, Chicago; while first-half basic is around \$50, Birmingham, and foundry may be said to range from \$46 to \$50, Birmingham, for the same po-The Southern car situation is somewhat improved. High silicon Tennesse iron (containing phosphorus) delivery during the first half of 1918, ranges from \$48, furnace, for 4 to 5 per cent, to \$55, furnace, for 8 to 9 per cent, taking a freight rate of \$2.75 to Chicago. For delivery in the last half, 8 per cent Tennessee silvery has been quoted at \$80, furnace. Northern iron is unchanged at \$55, furnace, for malleable Bessemer, basic and No. 2 foundry, with inquiry much lighter, a condition not displeasing to the sellers.

A report that \$52 was paid for 5000 tons of iron, pre-sumably Northern, for the last half of 1918 is accepted inasmuch as the definite offer was made to one seller, and the proffer declined. A Virginia maker of foundry iron offers a small tonnage of No. 2 for the first half at \$50, but to selected buyers only, and then subject to confirmation. Makers of charcoal iron are confining their sales to regular customers only, declining in many cases to quote on attractive new business. The quotations of the leading makers continue to show some variance. The minimum quotations are \$56 to \$58.50, f.o.b. furnace, another interest quoting \$57.50 to \$60, furnace. Standard low phosphorus is scarce and in good demand, quotations ranging from \$85 to \$90 and upward, delivered. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 1 to 4\$58.00 to \$62	00.5
Lake Superior charcoal, Nos. 5 and 6	
and Scotch 58.00 to 62	.00
	.50
Northern coke foundry, No. 2 55	.00
	.50
	.00
	.50
	.00
	00.0
	5.00
Low-phosphorus 85.00 to 90	1.00
Silvery, 8 per cent 70.00 to 80	1.00

Ferrealloys .- No change is reported in 80 per cent ferromanganese, quotations ranging from \$400 to \$450, according to delivery, the higher price applying to prompt and the lower to first half delivery.

Plates .- Except for one Eastern mill, which quotes 10c., Pittsburgh, or 10.189c., Chicago, for such limited quantities as it can supply, makers are unwilling to name a price. Many instances are related where mills have refused to accept 9c. to 10c. It is the opinion of some of the mill representatives that prices will decline if an embargo is placed on exports, and at least some of these representatives say they would welcome a change in this direction.

We quote for Chicago delivery of plates out of jobbers' stocks, &c.

Structural Material -In shapes, also, the only available quotation is that of an Eastern mill which quotes 6c., Pittsburgh, or 6.189c., Chicago, for such lots as it can roll. Small structural jobs are said to be numerous, despite conditions, and the awards, especially for railroad bridge work, show a betterment. The Grand Trunk System has placed 1000 box cars, for use in the United States, with the American Car & Foundry Co. Florida & East Coast Railway is inquiring for 100 box cars, the United Verde for 30 ore cars and the Baltimore & Ohio for 14 hoppers. These latter inquiries would hardly be noticed in other times. The structural awards of the week follow:

Northern Central Railroad Co., tanks for elevator, Balti-more, Md., 173 tons, to American Bridge Co. Ohio & Colorado Smelting & Refining Co., addition to Wedge Roaster Building, Salida, Col., 120 tons, to American

Commonwealth-Edison Co., Lowe Avenue Substation at Chicago, 143 tons, to Gage Structural Steel Works. Kelley Convertible Auto Truck Co., 1200 truck frames, Chicago, 132 tons, to not reported.

Northern Central Railroad Co., elevator at Baltimore, Md., 7 tons, to Christopher Simpson, St. Louis. Great Northern Railway Co., one beam and six plate girder spans, 270 tons, to Wisconsin Bridge Co.

Jobbers quote 5c. for material out of warehouse,

-No great change in the bar situation is noted. Bars .-Mild steel is quoted at 4.50c., Pittsburgh, or 4.689c., Chicago, by an Eastern mill; from others no quotation is Rail carbon bars are a little easier at 4.25c. to 4.50c., Chicago, it being intimated that sales have been made at concessions. Iron bars are unchanged at 4.50c. to 5c., Chicago.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.50c. to 5c.; reinforcing bars, 4.50c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

Wire Products.-The leading interest adheres to its

nominal base of 3.20c. for wire nails, although other producers quote 4c. and upward. The policy of not taking new business is gradually reducing unfilled orders to give the Government demand the right of way. The demand for woven wire fencing is not as good as it usually is at this season, farmers using more barbed wire than ordinarily. Some independent manufacturers who make cement-coated nails are making no prices to their trade, leaving that to be determined at the time of delivery. Quotations to jobbers, per 100 lb., Pittsburgh, are as follows:

Plain fence wire, Nos. 6 to 9, base, \$4.189; wire nails. \$4.189; painted barb wire, \$4.339; galvanized barb wire, \$5.039; polished staples, \$4.339; galvanized staples, \$5.039; all Chicago, carload lots.

Rails and Track Supplies.—Though the leading interest quotes \$70 for tie-plates, others ask and have obtained \$90 to \$100, Chicago.

Quotations are as follows: Standard railroad spikes, 4.25c. base; small spikes, 4.50c., base; track bolts with square nuts, 5.25c., all in carloads, Chicago; tie plates, \$70 to \$90 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open hearth, \$40; light rails, 25 to 45 lb., \$65; 16 to 20 lb., \$66; 12 lb., \$67; 8 lb., \$68; angle bars, 3.25c., base.

Bolts and Nuts.—But little new business is being considered by the makers. They are speculating as to what effect any Government attempt to control exports will have upon their trade with the Far Eeast. Japan in particular has been a large buyer of bolts and rivets. For prices and freight rates, see Finished Iron and Steel, f.o.b. Pittsburgh, on page 107.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to 3c x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to 3c x 6 in., 40-2½; larger sizes, 30-5; hot pressed nuts, square, \$3, and hexagon \$3 off per 100 lb.; lag screws, 50 per cent off.

Old Material.-While further reductions in prices are to be noted, the market is nevertheless holding up fairly well, and it is declared that none of the dealers are inclined to sell short. While the recent tendency has been downward, prices are to some extent supported by the situation in the East. Even at present levels, Eastern buyers have found they can afford to pay the freight rate on material from the West and have done so. It is admitted that the local market is not so strong. Several railroads have issued lists of moderate size, among them the following: Union Pacific, C., C., C. & St. L., Pere Marquette, C. & I., Soo Line and C., St. P., M. & O. The Great Northern, under date of June 30, offered 3500 tons of low grade 56 and 60-lb. rails with angle bars which have been in use on a logging road. It also offered 1000 tons of No. 1 steel rail scrap. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	\$45.00 to \$46.00
Relaying rails	
Old carwheels	
Old steel rails, rerolling	
Heavy melting steel scrap	
Frogs, switches and guards, cut apart	
Shoveling steel	
Steel axle turnings	23.50 to 24.50

Per Net Ton

Iron angles and splice bars	45.00 to	\$45.50
Iron arch bars and transoms	45.00 to	45.50
Steel angle bars	39.00 to	39.50
Iron car axles	50.50 to	51.50
Steel car axles	49,00 to	50.00
No. 1 railroad wrought	39.00 to	40.00
No. 2 railroad wrought	37.00 to	37.50
Cut forge	36.00 to	
Pipes and flues	26.50 to	
No. 1 busheling	28,50 to	
No. 2 busheling	20,50 to	
Steel knuckles and couplers	41.00 to	
Steel springs	41.50 to	
No. 1 boilers, cut to sheets and rings.	26.50 to	27.00
Boller punchings	36.50 to	37.00
Locomotive tires, smooth	50.00 to	
Machine-shop turnings	20.00 to	
Cast horings	18.50 to	
Cast borings		
No. 1 cast scrap	29.50 to	
Stove plate and light cast scrap	20.50 to	
Grate bars	24.50 to	
Brake shoes	24.50 to	
Railroad malleable	33.00 to	
Agricultural malleable	27.50 to	
Country mixed scrap	17.00 to	17.50

Steets.—The demand for sheets in connection with Government work is heavy and it is being cared for. Leading makers are not quoting on private needs as a rule, although they are serving their contract customers, and occasionally taking a new order. About the best quotations to be obtained are 9.189c., Chicago, for No. 10 blue annealed; 10.189c. for No. 28 black, and 11.189c. for No. 29 galvanized. Jobbers' quotations are unchanged.

We quote for Chicago delivery out of stock, regardless of quantity, as follows; No. 10 blue annealed, 9.50c.; No. 28 black, 9.50c.; and No. 28 galvanized, 11c.

Cast-Iron Pipe.—Government needs for the cantonments continues to engage the attention of the makers. Several hundred tons of 16-in. pipe will be used at Fort Benjamin Harrison, Ind. On July 13, Duluth, Minn., is expected to place 900 tons. Quotations are unchanged.

Quotations per net ten. Chicago, are as follows: Water pipe, 4 in., \$68.50; 6 in. and larger, \$65.50, with \$1 extra for class A water p.pe and gas pipe.

Philadelphia

PHILADELPHIA, July 9.

Additional Government work has been given out to fabricating shops in this territory during the past week, and it is understood that substantial tonnages have been allotted. In addition, different shops have been notified to expect orders at any time under the Government price plan and specifications are now being looked for. In fact, Government influence and Government policy seem to be the main factors in this market at present, for in addition to the concrete effect which army and navy orders are having on the steel supply available for civilian purposes, uncertainty over Federal price fixing and the application of the embargo on overseas shipments have given emphasis to a policy of watchful waiting on the part of manufacturer and consumer alike. Nobody seems anxious for commitments very far forward until some of the haze clears away. Meanwhile, the first week in July has lived up to its reputation as a period of comparatively little business, but there has been a stiffening of prices for prompt or nearby delivery in most lines.

Pig Iron.-Actual transactions have been comparafew and small, with inquiry rather less. chief business offered during the week is the inquiry of the Lenoir Car Works for 6400 tons of six specified analyses, delivery running into the first half. Eastern Pennsylvania No. 2 X foundry shows an advance to \$54.50 delivered on actual sales, with some firms asking anywhere from \$54.75 to \$55.75 and some sales at \$53.75 for 1917 and 1918 delivery reported. Virginia No. 2 X holds to the top of \$55.25 as previously reported, with \$52.75, Philadelphia, for first half 1918 quoted as the price of a leading interest which is back in the market with a restricted tonnage to offer. Steel-making irons are dragging again, with basic nominal at \$50 to \$52 and standard low phosphorus nominal at \$90. Copperbearing low phosphorus is held at \$85 to \$90 furnace, and one maker reports the bulk of his capacity taken for the first half. Some tonnages of off-grade irons, running as high as 0.06 sulphur, have moved at \$53. Gray forge has been quiet, with \$50 as a nominal price. Some sales of No. 2 foundry at \$48.50 Birmingham for first half delivery are reported by a local house. Quotations for standard brands, prompt shipment, and delivery in buyers' yards, range about thus:

Eastern	Pa.	No. 2	X	foun	dry		\$53.00	to \$54.50
Eastern	Pa.	No. 2	pla	in.		 	52.50	to 54.00
Virginia	No.	2 X	fou	ndry		 	 54.25	to 55.25
Virginia	No.	2 pla	in.			 	 53.75	to 54.75
Basic .						 	 50.00	to 52.00
Gray to	rge .					 	 	50.00
Standar	d low	pho	sph	orus		 	 	90.00

Structural Material.—Government activities are naturally affecting the structural output so far as general consumers are concerned, and though repeated refusals by the mills have had their effect in discouraging prospective buyers, prices have stiffened this week, and one large interest which had been giving 4½c. to 5c.,

Pittsburgh, as its range, is now on a flat basis of 5c. for anything like prompt delivery, with 4%c. at mill convenience. A second considerable interest is taking some business for third quarter specification on a basis of 6c. Pittsburgh, while a third producer, when able to supply shapes from a limited stock, is asking 5½c., Pittsburgh. Only two inquiries of moment are in this market this week—one of about 400 tons for a new building for the Consolidated Gas & Electric Co., Baltimore, and the other 2600 tons for the new public library of Philadelphia, on which bids will be taken this week.

Coke.—Fuel conditions are a trifle better than they were last week, both furnace and foundry grades being offered at \$1 less than a week ago for spot. To-day's prices are fairly represented by \$15 for foundry and \$14 for furnace for prompt delivery.

Ferroalloys.—Business has been dull in ferroalloys, with no changes in price noted. Ferromanganese holds at \$450 for prompt and \$425 for last quarter. Spiegeleisen is quoted at \$85 furnace for prompt.

Old Materials .- In general the market may be said to be quieter and a little softer on scrap for immediate shipment. There is still considerable shipment to the Pittsburgh district, but mills in Eastern territory are going slowly. Despite the lull, the fundamental conditions are not changed; that is to say, there is no great abundance of material and in the view of some houses in this market there is really a scarcity. Hence, the embargo on the exporting of iron and steel scrap, as proclaimed by the President, has become a matter of interest here, for there is a great volume of scrap, now owned by foreigners and awaiting export, in cities on the Atlantic seaboard. It is estimated that the quantity may reach 100,000 tons, and a good proportion is in storage in this city, held on Italian account chiefly. Italy, as an ally of America, might be willing to forego shipment and release this material to American buyers in return for shipments of semi-finished or finished steel This is one of the possibilities which to Italian ports. was pointed out to-day in the trade. Aside from such speculations, there has been little to record. A few leading numbers in the list of old materials have softened and have diminished the spread between their high and low, but, on the whole, prices have been well maintained. Though the actual market for old carwheels remains where it was last week, some small lots have been sold on a basis of \$45 a ton delivered. Prices per gross ton delivered in Eastern Pennsylvania territory range about thus:

No. 1 heavy melting steel	40.00 to \$41.00	
Old steel rails, rerolling	50.00 to 55.00	
Low phosphorus heavy melting	55.00 to 58.00	
	52.00 to 55,00	
	38,00 to 40,00	
No. 1 railroad wrought	55,00 to 57,00	
No. 1 forge fire	26,00 to 28,00	
Bundled sheets	26.00 to 28.00	
	18.00 to 20.00	
	26.00 to 28.00	
Cast borings	27.00 to 29.00	
No 1 east	27 50 to 40 00	
Grate bars, railroad	22.00 to 25.00	
Stove plate	22.00 to 25.00	
Wrought iron and soft steel pipe (new	02.00 00 00.00	
specifications)	38.00 to 40.00	,

Iron and Steel Bars.—Strong inquiry in both iron and steel bars is reported, and there is more than enough business to go around. Prices are maintained at 4½c., Pittsburgh, for steel bars, whether soft bars or reinforcing, with 4½c. to 5c., Pittsburgh, being asked by various makers of bar iron, with deliveries at mill convenience. On the basis of steel bars being worth 4½c., a local office has quoted standard spikes, in small lots, at 5½c., Pittsburgh, and taken orders for September delivery.

Sheets.—With nothing to sell, producers in this district are quoting a genuinely nominal price of 8½c. base Pittsburgh for No. 10 blue annealed. Government requirements have taken a considerable proportion of this district's output and will take more.

Plates.—As in the case of structural materials, Government specifications are becoming more numerous and are absorbing a larger proportion of mill output. This situation is beginning to interfere with deliveries of plates to private customers. Almost simultaneously with the announcement of the embargo on the shipment

of steel plates, export inquiries were received here to the extent of 33,000 tons, the largest block being 25,000 tons and the smallest 3,000. Minimum prices remain unchanged—10c. base Pittsburgh for tank and 12½c. for boat steel, with shipment at mill convenience. This means a minimum of 10 or even 12 months after orders are placed. Mills are running close to 100 per cent output and are making every effort to maintain maximum production, but they are finding rapid increases in cost, owing to the higher price of labor and raw materials.

Cleveland

CLEVELAND, July 10.

Iron Ore.-The movement of ore boats is being very seriously hampered by the congestion at the lower Lake docks, and the situation is made worse by the car shortage that adds to the delay in unloading. Some ore boats have been kept in Lake Erie ports five or six days awaiting their turn to unload and some now at the Cleveland docks will be tied up as long unless the car supply improves. During June 7,512,087 gross tons of ore was received at Lake Erie ports as compared with 4,095,973 tons for the previous month and 7,758,276 tons for June, 1916. Shipments to furnaces for June were 5,580,964 tons, an increase of 1,589,041 tons over the amount forwarded during May. The balance on docks July 1 was 4,828,523 tons, an increase of 707,218 tons over the amount of ore on docks June 1. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

Pig Iron.—The market in this territory has quieted Some consumers are deferring purdown materially. chases because of possible action by the Government in regulating prices. However, there is still a fair volume of inquiry, much of this being from brokers and from Eastern consumers. One important Lake furnace interest has advanced its price on foundry iron \$2 a ton to \$58 for No. 2, at which it has made several small lot sales and has quoted as high as \$60. A sale of foundry iron is reported at \$54 by a Valley furnace for the fourth quarter delivery, but Valley quotations generally range from \$55 to \$58. The only inquiry pending for steel making iron is one for 15,000 tons from the Pittsburgh district for the first half of next year. Southern iron prices are unchanged and the market is We note the sale of several small lots for not active. the first half delivery at \$45 Birmingham for No. 2 and some producers are asking \$50. Ohio silvery iron has sold at \$87 for early shipment or an advance of \$2. This price is being quoted for delivery this year and during the first half. We quote f.o.b. Cleveland, as follows:

Bessemer										 \$57.95	to	\$58.95
Basic												
Northern	No.	2 f	oun	dry						 55.30	to	58.30
Southern	No.	2 1	oun	dry						 49.00	to	54.00
Gray for												
Ohio silve												
Standard	Lower	27.34	CX 62	X200	110	20	Car	500.00	 	09 00	400	OF AA

Coke.—Several prompt shipment sales of foundry coke are reported at \$14 per net ton at oven for standard Connellsville makes and we note the sale of 800 tons at that price for delivery over a period of four months. Generally no prices are being named except for prompt shipment.

Finished Iron and Steel.-New inquiry in finished lines is not active and is confined largely to miscellaneous small lots of steel, much of which is required for Government work. Fairly heavy orders are being placed for motor truck requirements. The demand for plates for motor truck requirements. continues heavy. Sales of tank plates have been made by Cleveland mills at 11c. Pittsburgh, for delivery in about ninety days, and quotations range from 10c. to The sheet market is very firm and the demand for black and blue annealed sheets is heavy, although some manufacturers and jobbers are holding off because of the possibility of price regulation. Considerable inquiry is coming out for sheets for Government requirements. Among these is one for 1000 tons of black sheets for early shipment for camp ranges. Black and blue annealed sheets are now on about the same basis, the general quotation being 8.75c. to 9c. Pittsburgh for No. 28 black and No. 10 blue annealed. We quote galanized sheets at 10.50c. to 11c. for No. 28. Cleveland mills have advanced the price of bar iron to 5c. Hard steel bars are quoted at 4c. to 4.50c. Small spikes for which there is an active demand from coal mining companies are scarce and are quoted as high as 6c. to 7c. per lb. Warehouse business is fairly heavy, but stocks are badly depleted. Warehouse prices are unchanged at 5c. for steel bars, 5.25c. for structural material, 9c. for plates and 9c. for blue annealed sheets.

Bolts, Nuts and Rivets.-The price the Government will pay for bolts, nuts and rivets required for boats and other work is still unsettled. A committee of the Bolt, Nut and Rivet Institute has been appointed to confer with the Government authorities and it is expected that this committee will be called to Washington this week for conference in regard both to prices and the distribution of orders among various manufacturers with the view of securing for the Govern-ment the best deliveries. The demand for bolts and nuts continues heavy, considerable business coming from wagon builders and other manufacturers having Government orders. We quote rivets at 5.25c., Pittsburgh, for structural and 5.35c. for boiler rivets. Present bolt and nut quotations do not represent minimum prices but those for the general run of orders. Buyers of round lots are allowed 5 to 10 per cent discount from the regular discounts which are as follows:

Common carriage bolts, % x 6 in., smaller or shorter, rolled thread, 35 off; cut thread, 30 and 5; larger or longer, 20. Machine bolts, with h. p. nuts, % x 4 in., smaller or shorter, rolled thread, 40; cut thread, 35; larger and longer, 25. Lag bolts, cone point, 40. Square h. p. nuts, blank, \$1.90 off list; tapped, \$1.70 off list. Hexagon, h. p. nuts, blank, \$1.70 off; tapped, \$1.50 off. C. p. c. and t. hexagon nuts, all sizes blank, \$1.25 off; tapped, \$1 off. Cold pressed semifinished hexagon nuts, 50 and 5 off.

Old Material.—The market is weak and prices on several grades have declined during the week. The sharpest slump is in heavy melting steel which is \$3 to \$4 per ton lower than a week ago. Boring and turnings are \$1 per ton lower. Fear that the Government will interfere and regulate scrap prices is still having its effect upon the market and some dealers look for still lower prices. There is a moderate amount of trading, largely in material on cars. With the uncertainty of the price situation some dealers are unwilling to buy or sell at present unless they can close both ends of the transaction and thus avoid the danger of a loss by price fluctuations. Cast scrap is firm and in good demand. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton \$38.00 to \$39.00		
Steel rails, rerolling	Per Gross Ton	
Steel rails, rerolling	Steel rails\$38.00 to \$	39.00
Steel rails, under 3 ft	Steel rails, rerolling 48.00 to	
Iron rails	Steel rails, under 3 ft 46.00 to	47.00
Steel car axies 55.00 to 57.50 Heavy melting steel 39.00 to 40.00 Carwheels 38.00 to 39.00 Relaying rails, 50 lb. and over 50.00 to 55.00 Agricultural malleable 29.00 to 44.00 Railroad malleable 42.00 to 44.00 Light bundled sheet scrap 24.00 to 25.00 Per Net Ton 1 Iron car axles \$55.00 to \$60.00 Cast borings 19.50 to 20.50 Iron and steel turnings and drillings 18.56 to 19.50 No. 1 busheling (nominal) 30.00 to 3.00 No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 3.500 Railroad grate bars 22.50 to 23.50	Iron rails 48.00 to	50.00
Heavy melting steel		
Carwheels 38.00 to 39.00 Relaying rails, 50 lb. and over 50.00 to 55.00 Agricultural malleable 29.00 to 31.00 Railroad malleable 42.00 to 44.00 Light bundled sheet scrap 24.00 to 25.00 Per Net Ton Iron car axles \$55.00 to \$60.00 Cast borings 19.50 to 20.50 Iron and steel turnings and drillings 18.50 to 19.50 No. 1 busheling (nominal) 30.00 to 32.00 No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 35.00 Railroad grate bars 22.50 to 23.50	Heavy melting steel	
Relaying rails, 50 lb. and over 50.00 to 55.00 Agricultural malleable 29.00 to 31.00 Railroad malleable 42.00 to 44.00 Light bundled sheet scrap 24.00 to 25.00 Iron car axles \$55.00 to \$60.00 Cast borings 19.50 to 20.50 Iron and steel turnings and drillings 18.50 to 19.50 No. 1 busheling (nominal) 30.00 to 32.00 No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 35.00 Railroad grate bars 22.50 to 23.50	Carwheels	
Agricultural malleable 29.00 to 31.00 Railroad malleable 42.00 to 44.00 Light bundled sheet scrap 24.00 to 25.00 Iron car axles 9 19.50 to 20.50 Iron and steel turnings and drillings 18.50 to 19.50 Iron and steel turnings and drillings 18.50 to 19.50 No. 1 busheling (nominal) 30.00 to 32.00 No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 35.00 Railroad grate bars 22.50 to 23.50	Relaying rails, 50 lb, and over 50.00 to	
Railroad malleable	Agricultural malleable 29 00 to	
Light bundled sheet scrap	Railroad malleable 42.00 to	
Per Net Ton Iron car axles	Light hundled sheet scrap 24 00 to	
Iron car axles	angue bundled blicet berap 21.00 to	20.00
Cast borings	Per Net Ton	
Cast borings	Iron car axles	60.00
Iron and steel turnings and drillings	Cast borings 19.50 to	
No. 1 busheling (nominal) 30.00 to 32.00 No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 35.00 Railroad grate bars 22.50 to 23.50	Iron and steel turnings and drillings, 18,50 to	
No. 1 railroad wrought 44.00 to 45.00 No. 1 cast 33.00 to 35.00 Railroad grate bars 22.50 to 23.50	No. 1 busheling (nominal) 30.00 to	
No. 1 cast	No. 1 railroad wrought 44.00 to	
Railroad grate bars 22.50 to 23.50	No. 1 cast	
20.00	Railroad grate hars 22 50 to	
Niove plate 21 00 to 22 00	Stove plate	22.00

Cincinnati

CINCINNATI, July 10-(By Wire).

Pig Iron.—There is a reluctance on the part of melters to take hold at the present time, and as a consequence new business is very light. Most consumers of foundry iron have this year's requirements provided for and a comparatively large number have bought at least part of their wants for the first half of next year. The furnaces and their selling agents are not making any effort to force the issue and are content to let the market slip along quietly, with only small orders being placed. The largest sale reported is for 1500 tons of Southern foundry iron for a Michigan melter. Another firm in the State bought 500 tons of Virginia iron, both

for first half shipment. A Virginia producer offered yesterday to take on a limited tonnage of foundry iron for first half shipment at \$50 furnace, and today advanced its price to \$52.50. A wide range of prices exists in the South, but for spot shipment \$47, Birmingham basis, is considered minimum. For last quarter and first half shipment, from \$46 to \$50 is quoted. It is reported from a reliable source that one Southern maker offered and sold some iron in this and the Chicago districts at \$45, Birmingham, for first half shipment. The high silicon irons continue to command fancy prices. Last week one car of 15 per cent Bessemer ferrosilicon brought \$125 at furnace for nearby shipment. The Ohio silvery irons range from \$85 to \$90 furnace based on an 8 per cent analysis. Northern iron is fast becoming an unknown quantity for prompt shipment, and for this year. Furnace iron has disappeared with only a little resale iron obtainable around \$55 to \$56, Ironton, which are the figures quoted for first-half movement. A number of inquiries have come to light for the last half of next year, but are understood merely to be feelers for expressions as to the future. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, as follows:

Southern coke					
Southern coke	. No. 2 f'dr	y and 2	soft.	49.90 to	51.90
Southern coke	No. 3 fou	ndry		50.40 to	51.40
Southern coke	No. 4 fou	ndry		50.00 to	51.00
Southern gray					
Ohio silvery,	8 per cent s	silicon		86.26 to	91.26
Southern Ohio	coke, No.	1		56.26 to	57.26
Southern Ohio				56.26 to	57.26
Southern Ohio				55.26 to	56126
Southern Ohio	malleable	Bessen	er	56.26 to	57.26
Basic, Northe				56.26 to	57.26
Lake Superior				56.75 to	57.75
Southern cary					

Finished Material.—Both steel and iron bars have advanced to 5c. base, and twisted steel bars are quoted by jobbers at 5.05c. Structural shapes are now quoted at 5.25c., and ¼-in. plates and heavier, 9½c. Cold rolled shafting, list price plus 15 per cent; rivets, ½ in. and larger, with round heads, 5.50c. base; with cone heads, 5.60c. The smaller sized rivets are quoted in keg lots at 15 per cent off list. Machine bolts, ¾ x 4 in. and smaller, are unchanged at 45 per cent discount; larger and longer, 30 per cent discount; files, 50 per cent discount; hack saw blades, 10 per cent discount, and hand taps at 50 and 7½ per cent discount. We quote No. 28 galvanized sheets at 10.15c. Cincinnati or Newport, Ky., and No. 28 black sheets at 8.15c., but these figures are only nominal.

Old Material.—The market has developed a surprising weakness, and nearly every grade of iron has been reduced all the way from 50c. to \$2 a ton. The rolling mills have curtailed their purchases, and the foundries are also indifferent about buying at present values, and the majority of them are simply taking scrap as needed. The incoming supply has increased so that yard stocks are now piling up at a slow but steady rate. The following are dealers' prices, f.o.b., at yards, southern Ohio and Cincinnati.

,	yards, southern Ohio and Cincinnati.
	Per Gross Ton
	Bundled sheet scrap. \$22.50 to \$23.00 Old iron rails 39.00 to 39.50 Relaying rails, 50 lb. and up 45.50 to 46.00 Rerolling steel rails 40.50 to 41.90 Heavy melting steel scrap 28.00 to 28.50 Steel rails for melting 38.00 to 38.50 Old carwheels 35.00 to 35.50
	Per Net Ton
	No. 1 railroad wrought \$38.00 to \$328.50 Cast borings 13.00 to 13.50 Steel turnings 13.00 to 13.50 Railroad cast 27.00 to 27.50 No. 1 machinery cast 27.50 to 28.00 Burnt scrap 17.00 to 17.50 Iron axles 47.50 to 48.00 Locomotive tires (smooth inside) 40.50 to 41.00 Pipes and flues 21.50 to 22.00 Malleable cast 26.50 to 27.00 Railroad tank and sheet 19.00 to 19.50
	(Ry Mail)

Coke.—Unheard of prices have been obtained for spot foundry coke in the Connellsville field. Right now this appears to be the only producing district that can take on any spot business. Last week some 72-hr. coke brought \$16.50 per net ton at oven, although this by no means represents contract prices. Contract figures are unchanged around \$11 to \$13, representing the very wide difference of opinion on the part of producers. Pocahontas and Wise County contract fig-

ures are about on the same level, although some Wise County 72-hr. coke might be bought for future delivery around \$10 to \$10.50. Furnace coke is at a standstill, although getting forward shipments as fast as needed has proved an exasperating experience in more than one instance. From \$9 to \$11 is quoted on contract business.

Birmingham

BIRMINGHAM, ALA., July 10—(By Wire).—Apparently the lowest price obtainable on 1918 pig iron is \$45, furnace, with sales made at \$46 and a disposition to go higher. Fifty dollars is common on spot iron and \$51 and \$52 have been paid. Some sales of last half of 1918 iron have been made at \$48 by one concern. Furnace interests are well sold into first quarter of 1918 and several are out of that market as well as 1917.

(By Mail)

The first week in July closed with 1918 iron firmer at the minimum of \$45 and some sales made at prices above that. The leading interest was quoting a minimum of \$45, and it is known that sales were made during the week at \$45 and \$46. A last quarter lot of iron brought \$50. The leading seller of foundry iron, which had been selling at \$45 for some time, withdrew from the market for first half of 1918 on July 6 and announced a quotation of \$48 for the last half of 1918. The retiring of such a large interest for such a period featured the week. Other foundry iron makers were quoting a minimum of \$45 for 1918, and one maker sold a lot of 500 to 700 tons for first quarter of 1918 at \$48. This iron in analysis approached No. 1 soft. One company of considerable importance reports having booked about all it cares to for the first quarter of 1918. Furnaces are no longer interested in 1917 business, and have nearly all marked up to \$50 for the rest of this year. So far as can be ascertained, not a sale of spot was made during the week under \$50. Reliable brokers who handle this business say prices obtained were \$50, \$51 and \$52. Furnace operators are not forcing the rises; indeed, some are looking ahead to a possibility of inability on the part of the consumer to take the iron if it goes much higher. volume of business done for 1918 very well covers first quarter output. Sloss-Sheffield has two stacks on basic for the allies, and will finish that contract in the early fall, it is understood. Talladega furnace is understood to be nearing the operating point. Trussville may not Repairs on Vanderbilt furcome in until September. nace are being rushed by the Woodward Iron Co. The output continues to break records month by month. We quote per gross ton f.o.b Birmingham district furnaces for prompt delivery as follows:

No. 1 four	idry a	nd	soft.		 .\$50.50 to	\$51.50
No. 2 four	idry a	nd	soft.	 	 . 50,00 to	51.00
No. 3 fou						
No. 4 fou	ndry				. 49.25 to	50.25
Gray forg						
Basic				 		
Charmani					55 00 %	x 56 00

Steel Bars.—Steel bars in car lots, f.o.b. Birming-ham, 4.50c. to 4.75c.; iron bars, 4.30c. to 4.40c.

Cast-Iron Pipe.—Pipe for cantonments at Columbia, S. C., Louisville, Fort Sam Houston, Tex., and other points, leaves Birmingham from different shops almost daily. Orders from the trade at large are scattering. Those that come are placed at the quoted prices. We quote, per net ton, f.o.b. Birmingham pipe shop yards, as follows: 4 in., \$63; 6 in. and upwards, \$60, with \$1 added for gas pipe and extra lengths.

Coal and Coke.—Coal and coke operators are concerned with delivery only, maximum prices maintaining as a rule. Both industries are busy and highly prosperous. Standard beehive foundry coke sells at \$14 to \$15. Blacksmithing coal brings \$6.

Old Material.—The scrap market has rallied from the wild spurt which was caused by a tremendous demand from the East, and has settled down to a much quieter market, although the general tone is strong enough to maintain the present price schedule. Some transactions are made below the following quotations by 50c. to \$1, but, as a rule, they hold. We quote per gross ton f.o.b. Birmingham dealers' yards as follows:

011 -1-11-	
Old steel axles\$50.00	
Old steel rails 37.00	
No. 1 wrought	to 40.00
No. 1 heavy melting steel 25.00	to 27.00
No. 1 machinery cast	to 28.00
Carwheels 27.00	to 29.00
Tram carwheels 25.00	to 30.00
Stove plate and light 19.00	
Turnings 13.00	

Buffalo

BUFFALO, July 10.

Pig Iron.—Most of the furnaces of the district are out of the market for 1917 business, and will not take even carload lot orders for this year's delivery. Inquiry for 1918 is not active at present, and some furnaces are not quoting on their next year's production, but are planning to await developments for the next two or three months. Prices are very firm, and have an advancing tendency. Such tonnages as are quoted on for next year are \$53.00 to \$55.00, for No. 2 X foundry, with other grades in proportion, according to silicon content, and for this year's delivery, wherever any quotations can be brought to light, the price range is \$55.00 to \$58.00, according to grade, and the views of the seller. As intimated above, very little tonnage of any grade is procurable from the furnaces of the district for 1917 delivery, even at this high range in price. For 1918 iron, first half delivery, we quote as follows, f.o.b. furnace, Buffalo:

High silicon irons	\$54.00 to \$56.00
No. 1 foundry	53.00 to 55.00
No. 2 X foundry	52.00 to 54.00
No. 2 plain	
No. 3 foundry	50.00 to 51.00
Gray forge	50.00 to 51.00
Malleable	53,00 to 55,00
Basic	53.00 to 55.00
Lake Superior charcoal, f.o.b. Buffalo.	55.00 to 60.00

Finished Iron and Steel.-The market is practically at a standstill as regards closing of transactions, because of the mills declining to entertain further sales until they know more clearly just what the Government demands are going to be, and buyers are not inclined to submit new orders. Pressure for steel already ordered is, however, becoming more urgent. The mills are converting more and more of their tonnage to Government work. Everything in the way of tin plate is in active demand. Standard railroad spikes are in strong demand, and prices have advanced, with prospect of still further advance in the immediate future. The Ferguson Steel & Iron Co., Buffalo, has the contract for 125 tons of structural steel for the construction of an engine house and signal tower for the New York Central Railroad Co., at its Gardenville yards.

Old Material.—The market has been quiet during the past week, with a let-up in buying in almost all lines, particularly in heavy melting steel on the part of the larger consumers. For heavy axle turnings, however, increased demand is shown, and the price for this commodity has advanced, now being held at \$28.00 to \$29.00 per ton. Trading in the other commodities on the list has been very light, compared with business done during the past two or three weeks. The placing of the embargo by the United States against the exportation of scrap has had a restraining effect on dealings, and the definite results of this action by the Government are being waited for by dealers. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$38.00 to \$3	39.00
Low phosphorus	55.00 to (60.00
No. 1 railroad wrought	50.00 to 1	55.00
No. 1 ra Iroad and machinery cast	32.00 to 3	33.00
Iron axies	55.00 to (60.00
Steel axles	55.00 to (00.08
Laiwilee S	38.00 to	10.00
Rallroad malleable	35.00 to 3	36.00
Machine shop turnings	21.00 to 2	22.00
Heavy axle turnings	28.00 to 5	29.00
Clean cast borings	21 00 to 5	22.00
iron rails	45 00 to	16.00
Locomotive grate bars	23.00 to 5	24.00
Stove plate	23.00 to 2	24.00
Wrought pipe	35.00 to 3	36.00
NO. I busheling scrap	33.00 to 3	34.00
No. 2 busheling scrap	21.00 to 2	22.00
Bundled sheet stamping scrap		23.00

British Steel Market

Ferromanganese Strong—Tin Plates Higher— Pig-Iron Supplies Increase

London, England, July 11.—(By Cable.)
Supplies of Cleveland pig iron are increasing, but the market is quiet. Hematite iron is strong. Semifinished steel is idle and nominal. Wire rods are quoted nominally at £30 c.i.f. Tin plates are firm at 35s. 6d., basis. Ferromanganese is strong, with \$400 paid for delivery in the United States c.i.f. fourth quarter. We quote as follows:

Tin plates, coke 14 x 20; 112 sheets, 108 lb., fo.b. Wales, 35s. 6d. against 35s. last week.

Black sheets, £21 5s.

Ferromanganese, £45 nominal.

Ferrosilicon, 50 per cent, c.i.f., £35 upward.

Benzol is quoted at 14d. as against 13d. per gallon a month ago. Toluol is unchanged at 2s. 3d. and ammonium sulphate is still nominal.

Scarcity of Ferromanganese and Tin Plates—Pig Iron Firmer and Higher

London, England, June 19 .- (By Mail).

Intense pressure to fill national requirements is the dominant factor. Demand for steel is an ever increasing one, and as this is expected to continue indefinitely it threatens to become more acute. A close control is kept over the allocation of material. The heavy demands incidental to the speeding up of the shipbuilding program constitute an additional factor of importance. Little or nothing is heard of general merchant business, which has been wiped out of existence. The steel market is faced with many difficulties, including troublesome labor, with far more orders to execute than can be filled.

The tendency in pig iron has been firmer, as indicated by the recent sanction of an advance of 5s. a ton in the price of common South Staffordshire material. Adjustments may possibly ensue in other maximum prices on the applications made because of increased costs. Due to the increased output of Cleveland foundry material there has been a further extension of the allocations this month to home consumers who are now comfortably situated, but the pressure of demand for East Coast hematite cannot be met fully, although there has been some improvement in the output of steelmaking irons in other districts. Export business in hematite is restrained. There is a full supply of forge iron available and export business in this could easily be larger, given tonnage facilities.

Semi-finished steel is unchanged. But little surplus is to be had after the heavy Government requirements are filled. American billets are not being offered, and the market for semi-finished material is nominal. Wire rods are wanted at about £28, c.i.f. Liverpool, but very little is obtainable and pounds over that figure are asked, terms being subject to freight, which is very scarce.

In the finished steel accumulation of orders is as great as ever, and makers have but little room for new business, while heavy deliveries are being made against current Government contracts. Scotch works are busier in view of the large requirements of shipbuilders.

Tin Plates and Ferromanganese Scarce

Black sheets are quiet, works being well booked. The galvanized sheet trade remains absolutely paralyzed, due to the prohibition. Demand for tin plates is incessant, but business has become more and more circumscribed through the growing scarcity of offers of all kinds of plates. As already cabled, a census of all stocks has been ordered, suggesting a more rigid control enforced over the supplies, available and suitable for war work. A lot of Government business is waiting to be placed, and prices are tending upward strongly to about 35s. per basis box f. o. b. for war work. There is still inquiry for oil plates, but makers are fully booked and there is little stock to be had. The Welsh output is now about 15 to 20 per cent of the normal, and there is no sign of relief in raw material.

It is utterly impossible to obtain reliable f. o. b. quotations for ferromanganese, the market being quite at sea and nominal. Demand continues unabated, but sellers are rare and asking much stiffer terms. Some business has been done for the first quarter of 1918 at \$325 to \$350 c. i. f. for American port, and at about £65 f. o. b. for a Mediterranean port. Indian manganese ores are wanted at full prices, but the fixing up of freight is more difficult.

St. Louis

St. Louis, July 9.

Pig Iron.-Although there has been no cessation of the upward tendency in pig iron, particularly Southern brands, in this market there has been a very definite disposition on the part of melters to make purchases. However, they have been largely prevented by the fact that very few furnaces represented in this territory are willing to take on any business, partly on account of various uncertainties, but chiefly because of their sold-up condition well into next year and an indisposition to tie themselves up to contracts beyond the first half of 1918 and not all of their capacity for that While No. 2 Southern foundry iron is valued at \$48, no quotation at that figure can be made and some furnaces represented here have informed their agents that they want at least \$55, Birmingham, for the remainder of their output for the first half of 1917. Most of the furnaces are entirely out of the market. The sales during the week were chiefly in small lots ranging from 300 tons down with the exception of one sale of 1000 tons of malleable and one reported sale of 15,000 tons of basic for December and first half delivery at \$50, Birmingham, confirmation of which was not acknowledged, though no positive denial was forthcoming. Outside of the special transactions noted, the sales for the week may have aggregated 2000 tons, all as the result of negotiations, no widespread inquiries being put on the market these days.

Coke.—No contract coke, either 48-hr, or 72-hr., is available in this market and the ovens are holding to the high spot prices of \$16 to \$18, Connellsville, and some small sales have been made at those figures. No by-product coke is to be had and the situation is becoming crucial for some melters who cannot get what their needs require, even though they are willing to take their coke in open cars.

Finished Iron and Steel .- There is literally no market in finished products at this point, as mill representatives are refusing to take business and are, in addition, deferring deliveries because of the Government needs, which are given precedence, of course. Two railroads are feeling out the steel rail situation, one for a small lot for early delivery and another lot for 1919 of about 30,000 tons, while the second is for 1919 delivery of about 20,000. So far as can be learned here, they are receiving very little encouragement. ment out of warehouse continues up to the ability of the warehouses to meet the demand, which is as a mat-ter of fact excess of stocks on hand or available from shipments. We quote for stock out of warehouse as follows: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.05c.; tank plates, 8.05c.; Nos. 8 and 10 blue annealed sheets, 9.55c., these gages having been coupled in the quotations; No. 28 black sheets, cold rolled, one pass, 9.85c.; No. 28 galvanized sheets, black sheet gage, 11.25c.

Old Material.—In the scrap market, it continues to be anybody's guess both as to present prices and as to what the market is going to do next. Dealers are afraid to play the market either way and are doing only such business as is required by the status of their contracts on hand. While it is recognized that supplies are short and that there is little hope of any increase from railroad loading or other sources, at the same time there is a weakening tendency apparent due of course to the actual inactivity and the normal tendency to reduce prices when there are no transactions being made. No lists have been put out during the past week and altogether the market is a most treacherous one with no

definite justification for a prediction of a movement in either direction. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows, with the reservation that transactions are strictly upon the buyers' and sellers' needs at the moment rather than upon any market figures that might be given:

Per Gross Ton

Old iron rails\$ Old steel rails, re-rolling Old steel rails, less than 3 ft	45.00 to	45.50
Relaying rails, standard section, subject to inspection		51.00
	38.00 to 34.00 to 32.50 to	
Frogs, switches and guards cut apart Ordinary bundled sheet scrap	39.00 to 19.50 to	39.50 20.00

Per Net Ton

Per Net Ton		
Iron angle bars	36.00 to	\$37.00
Steel angle bars	50.00 to	36.00 51.00
Iron car axles	50.00 to 48.00 to	48.50
Steel car axles	41.00 to	41.50
Wrought arch bars and transoms	39.00 to	40.00
No. 1 railroad wrought	37.00 to	38.00
No. 2 railroad wrought	33.00 to	34.00
Railroad springs	35.00 to	36.00
Steel couplers and knuckles	55.00 10	30.00
Locomotive tires, smooth inside, 42 in.	45.00 to	46.00
and over	33.00 to	34.00
No. 1 dealers' forge	17.50 to	18.00
Cast iron borings	27.00 to	27.50
No. 1 busheling	23.00 to	23.50
No. 1 boilers cut to sheets and rings.	28.00 to	29.00
No. 1 railroad cast scrap	18.00 to	18.50
Stove plate and light cast scrap	31.00 to	31.50
Railroad malleable	25.00 to	26.00
Agricultural malleable	25.00 to	25.50
Pipes and flues	24.00 to	24.50
Heavy railroad sheet and tank scrap. Railroad grate bars	20.00 to	20.50
	19.50 to	20.00
Machine shop turnings	16,50 to	17.00
Country mixed scrap	10,00 00	21,00

New York

NEW YORK, July 10.

Pig Iron.-A lull has come in the pig iron market, at least so far as any large tonnages for domestic melting are concerned, but prices are firm and in some cases advances have been announced. The Virginia Iron, Coal & Coke Co., whose price Monday was \$50, furnace, for No. 2 foundry for the first half of next year, advanced Tuesday to \$52.50. Another illustration of advancing prices was furnished by one of the Buffalo companies, whose price to July 7 was \$53, furnace, on No. 2X for next year's delivery, but the company has now advanced to \$55 for the first quarter of next year, although continuing to sell at \$53 for the second quarter. For eastern Pennsylvania iron, at least one company has advanced to \$54, furnace, for this year and to \$53 for next year. The largest new domestic inquiry is for 2000 to 2500 tons of low phosphorus for the American Locomotive Co. for the last half of this year. A number of inquiries for from 200 to 500 tons of foundry iron have appeared. The largest inquiry for export is for 500 tons per month for the last quarter of this year and the first half of next year. This is for high silicon iron ranging from 14 to 17 per cent, and there is also an inquiry for 300 to 500 tons of 50 per cent ferrosilicon. It is doubtful whether this iron can be obtained for export. Keen interest is being manifested by exporters in the order of the President prohibiting the exporting of pig iron except by special permission. These permits must be obtained not by the sellers, but by those who are actually doing the exporting. We quote tidewater for delivery as follows:

No.	1	for	ind	ry.															\$54.25	to	\$55,25
No.	2	X.							0					 				 	53.75	to	54.75
No.	2	pla	iin.														0		53.25	to	54.25
Sout	the	rn	No	. 1	l	fe	ou	n	di	ry				 							54.75
Sout	the	ern	No	. 2		fo	u	no	lr	Y.	5	ir	nd	S	of	t					54.25

Structural Material.—Government business continues to monopolize the attention of fabricators almost to the exclusion of all other projects. An illustration is the building of the new public library at Philadelphia. Owing to some hitch in the original bids for the steel for this building, involving a considerable tonnage, it has been necessary to readvertise and it is stated that it will be almost impossible to obtain this steel because fabricators are inclined to give consideration at present to Government work only. Bids have been asked on 2400 tons for the new Government projectile plant at

Charleston, W. Va., and inquiries are out for 1200 tons for the new Park Avenue viaduct, which is to run from Fortieth Street northward around the Grand Central Station, New York. Apparently it will be difficult to obtain the steel for this viaduct. Bids have been opened on the 600 or 700 tons required for extension to the Bancroft and Isherwood halls at the Naval Academy at Annapolis, J. Henry Miller at Baltimore being the low bidder for the former and another Baltimore contractor the low bidder for the latter, but no awards have yet been made. It is stated that dormitories at West Point will also have their capacity The Pennsylvania Raildoubled in a similar manner. road is inquiring again for 500 tons for various bridge work and the Southern Railway has placed a small bridge with the Bethlehem Bridge Co., calling for 100 The American Bridge Co. has taken 500 tons tons. for a station for the Brooklyn subway, while the Brier Hill Steel Co. has taken 100 tons for the Boyertown Casket Co., Boyertown, Pa. The National Sugar Refining Co. is reported as asking for 800 tons for plant extension at Yonkers and the American Smelting & Refining Co. is stated to be placing several orders of 100 to 200 tons each for different plant extensions. No decision is yet reported on the 3800 tons for Culver Rapid Transit Line in Brooklyn, on which the Public Service Commission expects to make a decision very soon. We quote plain material from mill at 4.669c. to 5.169c., New York, the lower price in three to four months and the higher for small lots in earlier deliv-Shipments from warehouses are 5.25c. per pound, eries.

Ferroalloys.-Inquiry for ferromanganese for delivery next year is reported to be in fairly large volume and it is expected to be still larger in the near future. For delivery this year inquiry meager and sales for any position have been few in the last week. Consumers seem to be pretty well cared for by contracts and disinclined to make purchases under present conditions unless absolutely necessary. The spot market for domestic alloy is generally quoted as \$400 to \$425, delivered, with the last quarter at about \$375. For the first half of next year \$350 is being quoted. The fact that manganese ore imports in May are officially reported as 81,269 tons, next to the largest importation in the last 18 months, and also the fact that the production of ferromanganese in the United States in June will approximate 21,000 tons, according to the furnace reports of THE IRON AGE, are decidedly encouraging signs as to the future supply of this important product. Two new domestic producers of ferromanganese have appeared as active makers in the last month, one in the Buffalo district and another in New Jersey, and it is stated that a furnace in Virginia will be producing ferromanganese Aug. 1. The spiegeleisen market is very quiet with \$85, furnace, quoted for any delivery this year. Excellent inquiry for 50 per cent ferrosilicon has appeared, and some good sales are reported for next year's delivery at \$130. Material desired for this year's delivery is quoted at about \$200 to \$225, delivered.

Iron and Steel Bars .- Most of the larger mills still decline to quote on hard and soft steel bars. Bar iron is now being temporarily substituted for some of the purposes for which the steel bars are ordinarily used. Bar iron is being quoted by a leading producer at 4.75c., Pittsburgh, but small lots can be had from other sellers for 4.40c. to 4.50c. Several leading small arms and ammunition manufacturers have opened a joint purchasing office at 50 East Forty-second Street, New York, where, it is understood, all the steel for these plants will be purchased under Government supervision. Another allotment of shell steel for Government purposes is expected to be announced soon by the special committee of the American Iron and Steel Institute. We quote steel bars in mill shipments at 4.50c. to 5.50c. Pittsburgh, or 4.669c. to 5.669c. New York, and bar iron at 4.669c. to 5.169c., New York. From New York district warehouses bar iron is sold at 4.75c. and steel bars at 4.75c. to 5.50c.

Plates.—Business in plates is virtually at a stand-

still. Some small tonnages have been placed during the past week, but there are no large inquiries in the market aside from the Japanese shipbuilding concerns, which are still making offers higher than domestic consumers seem willing to pay. It is estimated that from 75 to 90 per cent of the business in plates during the past few weeks has been for export to Japan. Mills are receiving requisitions from the Government for ship plates to be sent to navy and merchant marine shipbuilding yards. There are inquiries in the market for shipment of tank plates to Russia, but difficulties are being encountered in obtaining the tonnage required. On mill shipments of universal and tank plates the price is 10.169c., New York, and ship plates, 12.169c., New York. Plates out of store are 9c. to 10c., New York.

Cast Iron Pipe.—The placing of orders by private buyers continues at a very satisfactory rate, but municipalities are not coming into the market and orders for the Government cantonments are not developing rapidly. Some pipe has been shipped to the cantonment at Ayer, Mass., but none has yet been furnished for the Long Island cantonment. Carload lots of 6-in. to 8-in. and heavier are now quoted at \$65.50 per net ton, tidewater, and 4-in., \$68.50.

Old Material.—The sagging in the scrap market, noted last week, has become much more pronounced so far as heavy melting steel is concerned and cast borings and turnings are also weak. The mills in the Pittsburgh district, Ohio and eastern Pennsylvania are all out of the market and things are at a standstill. Quotations have been marked down at least \$3 to \$4 per ton on most grades. Embargoes have been declared against Monessen and Lebanon and very little scrap is being shipped. The present condition is generally attributed to the attitude of the Government. It will not be surprising if an upward turn should come at a not far distant day. Brokers quote buying prices as follows to local dealers and producers, per gross ton, New York:

Heavy melting steel scrap (for ship-	
ment to eastern Pennsylvania)\$35.00 to \$3	6.00
Old steel rails (short lengths) or	
	7.00
	0.00
Rerolling rails 45,00 to 49	6.00
Iron and steel car axles 52.00 to 5	3.00
	0.00
	6.00
	3.00
	5.00
	2.00
	2.00
	1.00
Wrought-iron pipe (1 in. minimum	
diameter, not under 2 ft. long) 34.00 to 3	5.00

In spite of the weakness in steel scrap, the foundry market is being well maintained and machinery cast is strong. There has been a little better activity in stove plate, but prices have receded about \$1 per ton. Locomotive grate bars are not so strong. Dealers in New York City and Brooklyn are quoting as follows to local foundries per gross ton:

No. 1 machinery cast		37.00
No. 1 heavy cast (column, building material, etc.)	34.00 to	35,00
No. 2 cast (radiators, cast boilers, etc.)		30.00
Stove plate Locomotive grate bars	20.00 to	21.00
Old carwheels	35.00 to	36.00
Malleable cast (railroad)	36,00 to	38.00

Ten in Operation

CHICAGO (By Wire).—The second furnace of the four new stacks which the Illinois Steel Co. is adding to its Gary works was blown in last week, making 10 furnaces now in operation at Gary. Two more are to be completed.

The La Crosse Tractor Co., La Crosse, Wis., has announced a bonus of 10 per cent of wages earned to all employees who continue steadily in the company's employ until Nov. 1. Provision is made for pro rata payments to employees who may be conscripted. The company is adding to its working force and has recently sent a demonstrator as instructor in France and England to train men to operate tractors which have been sold in those countries.

Navy Can Build 32 Ships at a Time

The United States Navy shipyards have recently been buying large quantities of equipment, which Secretary of the Navy Daniels now announces will provide facilities for the construction of 32 warships at a time. Secretary Daniels said:

"With the shipways now being built or projected, the United States Navy yards will be able to have in course of construction on the ways at one time 16 war vessels, in addition to submarines and submarine chasers. Seven of the vessels could be battleships, two auxiliaries, such as transport, fuel ships, hospital ships, etc., and seven destroyers. Should the needs of the nation require battle cruisers, instead of battleships, it would be possible to substitute them on the longer slips for an equal number of battleships. As much work must be done on the vessels before the keels are laid and after launching, there could be under construction at one time in the yards at least double the number of vessels for which slips are available. This construction work is in addition to the repair work and rebuilding of the fleet which must be carried on."

Secretary Daniels announces that there are now under construction in Government yards three battleships, four destroyers and a number of submarines and submarine chasers. All work at navy yards is being rushed, the men working overtime and in shifts and bonuses are being offered for the completion of work ahead of schedule.

New Plant for Pittsburgh Steel Products Co.

The Pittsburgh Steel Products Co., Frick Building, Pittsburgh, which has a large plant at Monessen for the manufacture of seamless steel tubes, plans to build new works at Allenport, on the opposite side of the Monongahela River from Monessen, where it owns a site of about 300 acres. The extent of the new plant has not been determined, but it will probably be larger than that at Monessen. The Pittsburgh Steel Products Co. was formerly known as the Seamless Steel Tube Co. of America. The plant at Monessen turns out all sizes of seamless steel tubes from 1 in. to about 6 in. in diameter, the capacity being about 60,000 tons per year. The Pittsburgh Steel Company, which has blast furnaces, open hearth steel works and rod and wire mills at Monessen, and the Pittsburgh Steel Products Co. are largely identical.

Germany's Supply of Brass and Copper

The extent to which Germany is increasing its supply of brass, copper and other metals is illustrated by the testimony of a wounded British soldier on furlough at home. Referring to the large amount of old metal waiting to be gathered up after the war, he said it would be chiefly steel, for the Germans appear to be collecting the brass in thorough fashion for remelting. In several captured German trenches and dug-outs he had seen little canvas bags partly filled with broken fuses, nose-caps and other brass scrap, indicating that this method of collecting is being systematically carried out by the enemy.

New British Order on Machine Tools

A cablegram from the American Consul General, London, dated June 29, says that the Minister of Munitions gives notice of the withdrawal of the general permit to purchase or negotiate for the purchase of machine tools and machinery driven by power for metal working. It is now required that all applications for permits to purchase or enter into negotiations for such machinery be made to executive officers of area clearing house boards, whose addresses may be obtained from Director Central Clearing House, Ministry of Munitions, Charing Cross Buildings, London.

The Toledo Furnace Company, Toledo, Ohio, has increased its capital stock \$2,000,000. This amount of stock will be distributed among the present stockholders. The company plans to build during the coming fall a large concrete dock along the river front adjoining its plant.

IRON AND INDUSTRIAL STOCKS

Motor Stocks Weak-Effect of Taxation Being Carefully Considered

The fact that there has been a decided decline in the demand for pleasure automobiles, was reflected in the stock market last week and stocks of a number of the motor companies developed marked weakness. the general market there was less activity and the transactions amounted to only about 70 per cent of the volume of the previous week. The prices, as a rule, were lower at the end of the week. Call money during the week was easier, the highest rate having been 41/2 per cent compared with 6 per cent in the preceding week, while at the close of last week the rate was only 3¼ per cent.

In connection with the consideration of values of stocks, close study is being given to the provisions of the Senate revenue bill in regard to excess profits. While, of course, the Steel Corporation and other large companies will pay tremendous amounts into the national treasury, some of the smaller companies which had very low earnings in the years 1911, 1912 and 1913, on which the Senate bill bases calculations of average earnings, will find the provisions very severe. The same is true of new companies which were only getting under way in the years mentioned and of course had small earnings but have been prosperous during the

past two years.

Among the industrial stocks that registered gains during the past week were the following: National Enameling & Stamping, 1%; United States Steel Preferred, 1/8. Among the stocks that made losses during the week were the following: Allis-Chalmers, 114; American Car & Foundry, 1%; American Locomotive, 1%; American Steel Foundries, 2; Baldwin Locomotive, 1%; Bethlehem Steel Class B, 614; Colorado Fuel & Iron, 21/4; Crucible Steel, 31/2; Gulf States Steel, 4; International Harvester, 2; Lackawanna Steel, 3; Midvale Steel, 1½; Pressed Steel Car, 1; Republic Iron & Steel, 1½; United States Steel, 3. American Can stood at the end of the week the same as at the beginning at

The range of prices in active iron and steel stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com. 26 ½ - 29 ¾ Allis-Chal., pref	Int. Har. of N. J., pref
Cert 30 ⁵ 8 - 32 ⁵ 8 Gulf States Steel.123 -125 ¹ 4	U. S. Pipe, com
Gulf States Steel, 1st pref	U. S. Steel, pref. 1174-118 Va. I. C. & Coke, 68 - 694/
Int. Har. of N. J., com	Warwick 9 Westing Elec 4954 - 5044

Pacific Coast Merger

The Seattle Car & Foundry Co., Seattle, Wash., owned largely by William Piggott, has been merged with the Twohy Brothers Co., operating railway car building plants in Portland and Spokane. The new concern will be known as the Pacific Car & Foundry Co. The deal involves capital of more than \$1,000,000.

Headquarters of the new concern will be in Seattle, but the company will extend its activities and widen its markets to cover the entire Pacific Coast, as well as a large foreign trade. The plant of the Seattle Car & Foundry Co. has been engaged for years in the manufacture of railroad equipment for western lines, for logging railroads and for Japanese interests and other countries of the Far East, where a big trade has been built up. Backing up the merger, and forming an alliance with it, will be the entire resources of the Pacific Coast Steel Co., of which William Piggott is president. The plant of Twohy Bros. in Portland has an appraisal value of \$350,000, and does a big business in car building and repair work. This is the third purchase made by the Pacific Coast Steel Co. and the Seattle Car & Foundry Co. in less than a year. The first was the acquirement of the Irondale plant of the defunct Western Steel Corporation, which is being remodeled and equipped. The second purchase, made recently, gave the parent company the control of the Oregon Iron & Steel Co. at Oswego. The last merger is expected to be followed by the extensive improvement of the plants, in order to enter upon an extensive scheme of car building.

Industrial Finances

The Universal Motor Co., Oshkosh, Wis., has authorized a 10 per cent cash semi-annual dividend and will shortly make a 100 per cent stock dividend with the doubling of the capital,

The Liberty Steel Co., Warren, Ohio, has been authorized by the Secretary of State of Ohio to increase its capital stock from \$600,000 to \$750,000. The company was also authorized to issue \$150,000 of 10-year

6 per cent bonds.

The Russell Machine Co., Twenty-eighth Street, Pittsburgh, manufacturer of machinery and parts, has acquired the plant of the Thomas Carlins Sons Co., 1600 River Avenue, Pittsburgh, at a receivers' sale for a consideration of \$106,275. The Carlins property has heretofore been devoted to the manufacture of boilers, engines, stacks and kindred products, and will be used by the Russell company as an extension to its present works.

The property of the defunct M. H. Foundry & Mfg. Co., Belleville, Ill., was purchased at public auction July 3, by Henry Lengfelder, president Orbon Stove & Range Co., for \$8,700. The sale was conducted by E. E. Wangelin, trustee. The company, which was The company, which was devoted principally to the manufacture of sanitary drinking fountains, became bankrupt. It is understood that Mr. Lengfelder purchased the plant with a view to organizing a new company and resuming operations.

Dividends

The Colorado Fuel & Iron Co., quarterly, ¾ per cent on the common, payable July 25.

The Curtiss Aeroplane & Motor Co., 3½ per cent on the preferred, payable July 16.

The Standard Underground Cable Co., quarterly, 3 per cent and extra 3 per cent, payable July 20.

The United Alloy Steel Corporation, quarterly, \$1 per share, payable July 30.

The Willys-Overland Co., quarterly, 75c. per share on the common, payable Aug. 1.

Chain Works Purchase

The Rowe Calk Co., Hartford, Conn., has purchased the Diamond Chain Co., York, Pa., in order to have a source of supply for the anti-skid chain used in the manufacture of its grip device. The new officers of the Diamond Chain Co. are the following: President and factory manager, Samuel M. Horn, York, vice-president, William H. McLaughlin, Hartford, Conn.; secretary, treasurer and general manager, Warren D. Chase, Hartford, Conn.; assistant secretary, S. Ralph Horn, York, Pa.; assistant treasurer, E. S. Bestor, Hartford, Conn. All the above except Mr. Horn, who developed the business of the Diamond Chain Co., are connected with the Rowe Calk Co. Work was begun this week on considerable extensions to the plant at York. The chain company will continue to sell its product in the general market.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 York, 16.9c.; Philadelphia, 15.9.; 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb. Pacific coast (by rail only), pipe 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Poana Canal, as the boats are being used in transatlantic trade.

Structural Material

1-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 4.50c.

Wire Products

Wire nails, \$4 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire is \$4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.95; galvanized wire, \$4.65; galvanized barb wire and fence staples, \$4.85; painted barb wire, \$4.15; polished fence staples, \$4.15; cement-coated nails, \$3.90 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

Nuts and Bolts

Discounts in effect are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10

Carriage bolts, small, rolled thread, 40 per cent, small out thread, 35 and 2½ per cent; large, 25 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 cent; small, cut thread, 40 per cent; large, 30 per cent.

Machine bolts, c. p. c. and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent; with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point). 45 per cent.

Nuts. h. p. sq. blank, \$2.10 off list, and tapped, \$1.90 off; hex. blank, \$1.90 off, and tapped, \$1.70 off; nuts, c. p. c. and t. sq. blank, \$1.70 off, and tapped, \$1.50 off; hex. blank, \$1.60 off, and tapped, \$1.40 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

Wire Rods

Soft Bessemer and open-hearth rods to domestic consumers at \$95 to \$100; high-carbon rods made from ordinary open-hearth steel, \$100 to \$110, and special steel rods with carbons running from 0.40 to 0.60, \$100 to \$110 at mill; above 0.60 carbon, \$115 to \$120.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in, and larger, \$5.00 base; 3% in., 7/16 in and ½ in., \$7.50 to \$8. Boat spikes are about 6.50c. to 7c. all per 100 lb. f.o.b. Pittsburgh, but some makers are quoting above these prices. Track bolts with square nuts 6.50c, to 7c. to railroads, and 8c. to 8.50c, in small lots, for fairly prompt shipment.

Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. Light rails; 25 to 45 lb., \$75 to \$80; 16 to 20 lb., \$80 to \$81; 12 and 14 lb., \$82 to \$83; 8 and 10 lb., \$83 to \$84; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, lbr. with the standard section rails of Bessemer stock are held at \$38, and open-hearth section rails of Bessemer stock are held per gross ton. Pittsburgh.

Tin Plate

Long terne plate, No. 28 gage base, \$7.25 to \$7.50; short terne plate, \$12 to \$12.50, maker's mill, prices depending on quantity and delivery wanted. The present schedule of prices on terne plate is as follows: 8-lb., 200 sheets, \$14 per package; 8-lb., 214 sheets, \$14.30 per package; 12-lb., L.C., \$15.25 per package; 15-lb., I.C., \$15.75 per package; 20-lb., I.C., \$16.50; 25-lb., I.C., \$17.25; 30-lb., I.C., \$18.75; 40-lb., I.C., \$19.50.

Iron and Steel Bars

Steel bars at 4.50c. to 5c. for delivery late this year, and higher from warehouse, in small lots for prompt shipment. Refined iron bars, 4.75c.; railroad test bars, 5.25c. in carload lots and larger lots f.o.b. mill.

Wrought Pipe

The following discounts in steel are to jobbers for carloads on the Pittsburgh basing card in effect from May 1. 1917, all full weight except for LaBelle Iron Works and Wheeling Steel & Iron Co., which quote higher prices and National Tube, which adheres to card of April 1.

	Butt	Weld	
Inches Bla 15, ¼ and % 4 14 15, ¼ to 3 4	2 15½ 6 31¼	Inches Black 14 and 1/4 23 1/8 24 1/2 28 1/4 to 11/2 32	Galv. +4 +3 10 17
	Lap	Weld	
2 ½ to 6	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2 26	$\frac{12}{15}$
Batt V	Veld, extra	strong, plain ends	
	8 20 ½ 3 30 ½ 7 34 ½		14 18
Lap V	Veld, extra :	strong, plain ends	
2 1/2 to 4 4 4 to 6 4 7 to 8 3 9 to 12 3	$\begin{array}{cccc} 0 & 28\frac{1}{2} \\ 3 & 31\frac{1}{2} \\ 2 & 30\frac{1}{2} \\ 8 & 24\frac{1}{2} \\ 3 & 19\frac{1}{2} \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	14 17 16 8 3
4 to 6	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2 ½ to 4	

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe. On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price)

Boiler Tubes

Nominal discounts on less than carloads, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes, and from April 2, 1917, on lap-welded steel tubes are as follows:

Lap Welded Steel	Standard Charcoal Iron
1% and 2 in	1 ½ in
2 1/4 in	1 % and 2 in
3 and 314 in	2 % and 2 % in
3 1/2 to 4 1/2 in	3 and 3 ¼ in
5 and 6 in	3 4 to 4 4 in No quotations
7 to 13 in	5 and 6 in

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths.

Locomotive and steamship special charcoal grades bring higher prices.

1% in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as fol-lows, 30 days net, or 2 per cent discount in 10 days;

[Open-hearth stock, \$5 per ton above these prices.]

Blue Annealed Bessemer Cents per lb.		
Nos. 3 to 8. 8.00 to 8.50 Nos. 9 and 10. 8.25 to 8.50 Nos. 11 and 12. 8.50 to 8.75 Nos. 13 and 14. 8.75 to 9.00 Nos. 15 and 16. 9.00 to 9.25 Box Annealed, One Pass Cold Rolled—Bessemer Nos. 17 to 21. 8.30 to 8.50 Nos. 22 and 24. 8.35 to 8.85 Nos. 25 and 26. 8.40 to 8.90 No. 28. 8.50 to 9.00 No. 29. 8.55 to 9.95 No. 30. 8.65 to 9.15 Galvanized Black Sheet Gage—Bessemer Nos. 10 and 11. 9.00 to 9.50 Nos. 12 and 14. 9.10 to 9.60 Nos. 15 and 16. 9.25 to 9.75 Nos. 22 and 24. 9.55 to 10.05 Nos. 25 and 26. 9.70 to 10.20 Nos. 27. 9.85 to 10.35 Nos. 28. 10.00 to 10.50 Nos. 29. 10.25 to 10.05 Nos. 15 and 16. 7.80 to 8.30 No. 28. 10.00 to 10.50 No. 29. 10.25 to 10.75 No. 29. 10.25 to 10.75 No. 29. 10.25 to	Blue Annealed—Bessemer	Charte con H.
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Metal Markets

The Week's Prices

		Cents Per					
	Copper,	New Yorl					
				New			St.
	fuly Lake	lytic	York	York	Louis	York	Louis
	331.50	31.50	61.871/2	11.37 1/2	11.121/2	9.25	9.00
	531.25	31.25	62.25		11.00	9.25	9.00
	631.25	31.25	62.00	11.25		9.25	9.00
	731.00	31.00		11.25		9.25	9.00
	931.00	31.00	62.75	11.12 1/2	11.00	9.123/2	8.87 16
3	1030.75	30.75	63.00	11.121/2	11.00	9.121/2	8.871/2

NEW YORK, July 10.

All the metals are lower except tin and the entire market is extremely dull. There is little demand for copper and it has declined considerably. Tin has advanced because stocks are light. Lead is again lower with demand very small. Spelter continues stagnant and weaker. Antimony has again declined on little demand.

New York

Copper.-The tendency of the copper market has been easy for some little time, but yesterday a decided weakness developed. The real cause of the decline in the past two weeks and especially in recent days is difficult to locate. There has been almost an entire absence of business and it is not certain whether the lower prices come from first or from second hands. The quotation yesterday for both Lake and electrolytic was 30.75c., New York, a decline of 1c. per lb. since last week, but this is largely nominal. Quotations for later positions have also declined about 1/2c. per lb. to 29.50c, for the third quarter and 28.50c, for the fourth quarter, New York. It is surmised in some quarters that one important reason for the present weakness is due to the fact that producers may not be so sure that Government and other purchases will be made on a 25c. per lb. basis. It is felt that they may be realizing that the basis for purchases will be cost plus a reasonable profit, which would bring the price in many cases below that paid in May when 16.67c. was realized. The continued discussion of the subject at Washington with no agreement is considered ominous and the fact that the proposition that the aluminum producers made was thrown out is not regarded as favorable. The London market is unchanged at £142 for spot electrolytic.

Tin.-For another week cablegrams from London have been late practically every day and business has consequently been considerably hampered. This, together with the continued uncertainty as to the Government's attitude on taxes and other matters, has brought business almost to a halt. The fact that spot Straits tin has advanced in the last week to 63c., New York, or 1c. per lb., is attributed to the decrease in stocks which are now lighter than for some time and it is stated that it is easier to purchase 5 tons than 25 tons for this position. The market the entire week has been peculiar in that inquiries for futures have been strong one day with spot in poor demand while the next day the reverse has been the case. On July 5 there was a good demand for futures, amounting to 200 to 250 tons, which ended in some business, but the spot market was dull, while on July 10 futures were neglected and fairly large inquiries for nearby deliveries were hard to satisfy. Arrivals to July 10, inclusive, have been 700 tons, with the quantity affoat 4354 tons. Spot Straits tin in London yesterday was quoted at £247, an advance of £3 over that quoted a week ago.

Lead.—Demand for lead has slowed down decidedly and lower prices have naturally resulted. The quotation yesterday was 11c., St. Louis, or 11.12½c., New York, and it is understood that even lower than this has been quoted to some large buyers. Some of the larger producers state that they are unable to sell for July delivery while others say they can. The Government attitude is a disturbing factor and while the present position is relatively strong on the prospect of more orders from the Government, a further decline is expected by some before any change for the better.

Spelter.—The market continues to sag in the absence of any active demand. The quotation for early delivery by certain producers continues at 9c., St. Louis, or 9.25c., New York, but it is reported that some interests are shading this to 9.12½c., New York, on small transactions, the negotiations being conducted very quietly. Futures continue to be quoted slightly higher than nearby deliveries, or 9.12½c., St. Louis, and 9.37½c., New York, but buying is inactive. At present prices some producers are undoubtedly losing money, and it is stated that here and there some furnaces have been shut down ostensibly for repairs. Labor troubles are looming large, those in the Butte and Superior district being reported as serious. Nothing more is heard in detail as to the published report of the Government purchasing 11,000 tons of high grade spelter at 13.50c. per lb.

Antimony.—In the absence of demand the market has declined and is now quoted at 17c. to 17.50c., New York, duty paid, for Chinese and Japanese grades.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, is in poor demand for early delivery and is quoted at 57c. to 59c., New York. It is understood that the Government rejected the producers' proposal to furnish aluminum at 27½c. per lb., or an advance of 10c. over the 10-yr. average price.

Old Metals.—The market is declining. Dealers' selling prices are as follows:

Cents per lb.
Copper, heavy and crucible29.50 to 30.00
Copper, heavy and wire
Copper, light and bottoms
Brass, heavy
Brass, light
Heavy machine composition26.50 to 26.75
No. 1 yellow rod brass turnings 19.00
No. 1 red brass or composition turnings, 21.50 to 22.50
Lead, heavy
Lead. tea 9.00
Zinc 7.25

Chicago

JULY 9.—Consumers show a disposition to refrain from buying copper, evidently because of a belief that the market will drop lower. It is asserted, however, that the metal is stronger than most people realize. Futures continue strong, but prompt electrolytic is a little easier. Lead is dormant. Spelter pursues an unsatisfactory course, though prices are fairly firm. Antimony is inactive and weak. All the metals show a quiet trend. We quote as follows: Casting copper, 30c.; Lake, 31c.; electrolytic, 31c.; tin, carloads, 63c.; small lots, 65c. to 66c.; lead, 11c.; spelter, 9c.; sheet zinc, 19c.; Oriental antimony, 20c. to 21c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 25.50c.; copper clips, 25c.; copper bottoms, 23c.; red brass, 23c.; yellow brass, 16c.; lead pipe, 9c.; zinc, 6.50c.; pewter, No. 1, 35c.; tinfoil, 40c.; block tin, 45c.

St. Louis

JULY 9.- Rather quiet conditions prevail in the nonferrous metal markets, with the tone easier, if anything, than during last week. Today's quotations, in less than carload lots, are: Lead, 12c.; spelter, 11c.; tin, 67c.; Lake copper, 33c.; electrolytic copper, 32.50c. Asiatic antimony, 22c. In carload lots, lead was quoted today at 11c. to 11%c. and spelter at 8%c. to 9c. the Joplin district the demand for zinc blende was light and the price range, basis of 60 per cent metal, was \$65 to \$75 per ton, with the average for the district at \$70 per ton. In the second grades, there was some slight improvement in tone. Lead was steady for the week at a somewhat lower range than the previous week, the price for 80 per cent ore being \$120 per ton and the average for the week for the district \$119 per For calamine the price range remained steady a slightly lower range, \$35 to \$42 per ton, basis of 40 per cent metal, with the average for the district at \$38 per ton. Sheet ground properties have begun to shut down because of the price of ore, and this is beginning to reduce the production. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 12c.; heavy yellow brass, 15c.; heavy red brass and light copper, 19c. to 20c.; heavy copper and copper wire, 22.50c. to 23.50c.; zinc, 6c.; lead, 7c.; tea lead, 4c.

Pittsburgh and Nearby Districts

At Pittsburgh last week, final steps were taken for the consolidation of the Knox Pressed & Welded Steel Co., of Pittsburgh, and the Blaw Steel Construction Co., Hoboken, Pa., which became effective on July 1, the new company being known as the Blaw-Knox Co. Officials were elected as follows: Albert P. Lehman, president; I. F. Lehman, vice-president; F. M. Bowman, vice-president; L. L. Knox, vice-president; W. C. Coffin, vice-president; B. L. Hirshfield, treasurer, and C. H. Lehman, secretary. The board of directors consists of the above, and also Andrew M. Moreland, Charles Dreifus, Herbert L. May, Wayne Rawley, Hugo Sidenberg, George H. Martin and Joseph Prostaur. The general offices of the new company are at Hoboken, Pa., and the city sales offices are in the Farmers' Bank Building, Pittsburgh. The company maintains branch offices at 165 Broadway, New York; People's Gas Building, Chicago; Rialto Building, San Francisco, and No. 6 Beacon Street, Boston. The management of both the old companies remains the same in the new company. The Blaw-Knox Co. is now executing large orders for the Government.

The office of the American Ore Reclamation Co. has been moved from the Oliver Building to the Renshaw Building.

The Wire Drawing Machine Co., New Brighton, Pa., with a capital of \$100,000, has been incorporated by Albert H. Miller, Samuel A. McCullough and M. B. Houck

Following the decision in the 15 per cent rate cases the Inter State Commerce Commission has rejected complaints of the Youngstown Sheet & Tube Co., and the Pittsburgh Steel Co. against the Lake Shore & Michigan Southern, and the Wheeling Steel & Iron Co. against the Pennsylvania Railroad Co.

Industrial Troubles

About 2000 employees of the International Nickel Co., Bayonne, N. J., have declared a strike for a 15 per cent advance in wages. The men also ask the reinstatement of eight discharged members of a mediation committee.

About 100 employees of the Torsion Balance Co., Eighth Street, Jersey City, N. J., manufacturer of scales, etc., declared a strike on June 29 for an eight instead of nine-hour day. The company has notified the men of their formal discharge.

About 1500 employees connected with shipbuilding plants at Hoboken, N. J., declared a strike on July 2 for an advance in wages from \$3.95 to \$4.50 a day. The men are from the works of: Tietjen & Lang Dry Dock Co., Seventeenth Street; W. & A. Fletcher Co., Hudson Street, and the Consolidated Iron Works, River Street.

About 800 employees of the Hazard Rope Works, Wilkes-Barre, Pa., declared a strike on July 2, due to the discharge of a woman employee who had been active in union affairs. The men returned to work on July 5 upon the reinstatement of the woman.

In order to economize in coal and copper, and to provide capacity for a rapidly increasing demand, the Sioux City Service Co., Sioux City, Iowa, has made a careful study of its power plant conditions and electrical distribution system. Fred A. Krehbiel and E. N. Lake, of the Krehbiel Co., Chicago, have co-operated with the company's engineers in making detailed tests and reports. Following the recommendations of the engineers, extensive improvements will be made at once in the power plant and in the distributing system.

In order to release freight cars the New York Central Railroad (Lake Shore) is dumping hundreds of carloads of fabricated steel and ingots at Dune Park, in the Calumet region of South Chicago. The steel is destined for export to the French Government, but is presumably held up because of lack of ocean freight space. Meanwhile the cars are urgently needed for other service.

Some Sales Law Points

BY A. L. H. STREET

Liability of Guarantor of Payment of Note .- The seller of machinery took notes to cover the purchase price, with chattel mortgage security against the machinery. Payment of one of the notes was guaranteed by defendant. On default by the buyer, he gave the seller a bill of sale for the machinery, empowering the seller to resell. Under these circumstances, it is decided that the seller was not bound to proceed to a resale of the property in the manner required by the Wisconsin statutes relating to the sale of mortgaged property, in order to preserve the right to hold defendant on his guarantee on the property failing to yield enough to discharge all the notes. But the seller was not entitled to apply all the proceeds of the resale to three of the notes, payment of which defendant had not guaranteed, to the exclusion of the fourth note on which defendant was guarantor. (Wisconsin Supreme Court, International Harvester Co. vs. Holmes, 162 Northwestern Reporter, 925.)

Authority of Selling Agents .- Plaintiff, owning a lot of old machinery, rails, etc., caused them to be shipped to the yard of a second-hand machinery dealer for resale on such terms as might prove satisfactory to plaintiff. Some of the rails were sold to defendant by the dealer, and plaintiff, claiming that the sale was unauthorized, brought suit to recover the value of the rails from defendant. In ordering a new trial on plaintiff's appeal from a judgment in defendant's favor, it is held that where the owner of goods confers upon another an apparent right to sell them, a third person purchasing on the faith of such apparent authority will take good title to the property, notwithstanding any actual limitations on the second party's authority; but that the trial judge committed error in instructing the jury to the effect that if plaintiff had intrusted other similar property to the dealer for resale, that would be conclusive as to his authority to resell the particular property. This was error, because the proof as to such other property would merely be some evidence tending to show the extent of authority possessed by the dealer as to the particular property. (Arkansas Supreme Court, Rogers vs. Scott, 194 Southwestern Reporter, 689.)

Buyer's Rights as Against Delayed Delivery .- That buyer of machinery under a contract which requires the seller to make delivery by a specified time agrees to an extension of time for delivery to another specified date will not preclude him from rejecting delivery When the tendered by the seller after the later date. buyer notifies the seller that a thing ordered is needed at once, the seller's agreement to deliver by a specified time becomes one of the vital elements of the contract. And the fact that the buyer may give notice that the seller will be held liable for damages resulting from failure to make timely delivery under the contract cannot be interpreted as a waiver of right to reject delivery in that event. When the seller's failure to make delivery within a stipulated time has given the buyer ground for rejecting the subject of sale when tendered to him, his right to so reject delivery is not affected by the fact that there may be some other motive which is the real reason for the rejection, as shutting down of the plant in which the goods ordered were to be used. (United States Circuit Court of Appeals, Sixth Circuit; General Electric Co. vs. Chatta-nooga Coal & Iron Corporation; 241 Federal Reporter, 38.)

Waiver of Buyer's Right to Rescind Purchase.—
Applying the well established rule of law that right to rescind a contract is generally lost unless promptly exercised on occurrence of the ground for rescission, the Texas Court of Civil Appeals holds that where the purchaser of machinery retained it nearly three years after he became dissatisfied with it, and after being advised that the seller would make no further repairs, he deprived himself of any right to return the machinery and recover the purchase price. (Bancroft vs. Emerson-Brantingham Implement Co., 194 Southwestern Reporter, 991.)

PERSONAL

Charles M. Schwab and other officials of the Bethlehem Steel Co. were in Baltimore July 9 and witnessed the launching of the steamer Cubore, which was built at the Sparrows Point, Md., plant of the company for the Ore Steamship Co. Before the launching, Mr. Schwab said that although he had hinted that he would have an important announcement to make upon his next visit, the people of Baltimore would have to be disappointed on this occasion.

John L. Roche, formerly in charge of the bolt works of the Remington Arms Co., Chester, Pa., has resigned.

W. H. Portner, Maytown, Pa., has become superintendent of the works of the Gadsden Car Co., Gadsden, Ala.

At a meeting of the board of directors of the American Locomotive Co., held June 21, L. A. Larsen was appointed assistant comptroller, effective July 1.

S. Montaner, commission agent, Barcelona, Spain, whose business includes hoops and bands, black and galvanized sheets and steam motor trucks, is now in the United States. On July 12 he leaves for Havana, and on July 25 sails for Spain.

J. Curthew Sanders of Stewart, Sanders & Co., bolt and nut manufacturers, Johannesburg, South Africa, is now in the United States. His New York address is care Herzfelder & Son, 6 Cliff Street.

Robert Wuest, for so many years prominent in the metal-working field as secretary and later as commissioner of the National Metal Trades Association, has recovered his health and has returned to active business. He has established insurance offices in the Union Trust Building, Cincinnati, and will engage actively in the field of group insurance.

R. A. Bull, who has been connected for the past year with the Chicago Steel Foundry Co., Chicago, has been elected vice-president and general manager of the Duquesne Steel Foundry Co., Coraopolis, Pa., and has entered upon his new duties. Mr. Bull was formerly president of the American Foundrymen's Association.

P. D. Murphy, for 13 years in the sales department of the Aluminum Co. of America, Oliver Building, Pittsburgh, has resigned. Effective Monday, July 16, Mr. Murphy will become general manager of sales of the Ridgely Trimmer Company, Springfield, Ohio, manufacturer of steel wool, largely used by painters, paper hangers and other craftsmen as a substitute for sand paper.

Joseph G. Butler, Jr., of Youngstown, Ohio, has written a 300-page book entitled, "A Trip Through France in Wartime." The book deals with the industrial, social and military conditions in Europe, and also refers to the great expansion that will come to the iron and steel industry in France when the war is over. The edition is limited to 200 volumes, which will be distributed to friends of Mr. Butler in this country and Europe.

Charles S. Clark, formerly sales agent of the Pennsylvania Steel Co., Boston, has been elected first vice-president and general manager of the Laconia Car Co., and will make his headquarters at Laconia, N. H., where the business of the company will be transacted hereafter. Mr. Clark has been well known to the New England railroad, electric railway and steel business men for many years.

George W. Armstrong is president of George W. Armstrong & Co., Inc., Fort Worth, Texas, the firm recently organized to take over the Texas Rolling Mill Co., Fort Worth, Texas, and the Osage Iron & Steel Co., Sand Springs, Okla. The other officers are: Barney Smith, vice-president and general manager; Rufus A. Colgin, second vice-president, and John F. Foster, secretary and treasurer.

E. T. Edwards, Columbia, Pa., is treasurer of the Eastern Bar Iron Institute, the organization of manu-

facturers of bar iron which operates under the Eddy system of open price competition, and which has an office at 103 Park Avenue, New York.

Standish Meacham, advertising manager of Rogers, Brown & Co., Cincinnati, has sailed from an Atlantic port for France, where he will serve as a secretary of the Army Young Men's Christian Association.

R. H. Parks of the Bettendorf Car Co., Davenport, Iowa, has been appointed operating manager of the Canadian Car & Foundry Co., Montreal, in charge of all its car plants. W. S. Atwood has been appointed assistant to the vice-president and manager.

C. Edwin Clarke formerly master mechanic of the Cambria Steel Co., Johnstown, Pa., is now chief engineer of the Wilmington Steel Co., Wilmington, Del.

Clifford B. Langstroth, supervisor of the heat-treating and drop-forge departments of the Ross Rifle Company, Quebec, has been appointed metallurgist with the Link-Belt Co., Indianapolis.

Gordon M. Campbell, manufacturing engineer, General Electric Co., West Lynn, Mass., has joined the Kerr Turbine Co., Wellsville, N. Y., as works manager.

Sir Robert Hadfield has had a baronetcy conferred on him by King George of England.

E. J. Parker, manager of the Morgan Engineering Co., has joined the staff of the Vulcan Steel Products Co., 120 Broadway, New York, as sales manager of the machinery and tool department. The company contemplates opening a chain of offices in Europe, China and Japan, and Mr. Parker will leave shortly for abroad to personally conduct this work.

Murray Shipley has sold his entire interest in the Lodge & Shipley Machine Tool Co., Cincinnati, and has severed his connection with the company. Announcement has not been made as yet of the new officers. The death of William Lodge, who had been associated with Mr. Shipley in the enterprise for 25 years, occurred in April.

Harry Latshaw announces that he is no longer associated with Julius Blum & Co. and has become connected with the iron, steel, brass and copper firm of H. L. Latshaw & Co., 220 Broadway, New York.

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PERSONAL

Charles M. Schwab and other officials of the Bethlehem Steel Co. were in Baltimore July 9 and witnessed the launching of the steamer Cubore, which was built at the Sparrows Point, Md., plant of the company for the Ore Steamship Co. Before the launching, Mr. Schwab said that although he had hinted that he would have an important announcement to make upon his next visit, the people of Baltimore would have to be disappointed on this occasion.

John L. Roche, formerly in charge of the bolt works of the Remington Arms Co., Chester, Pa., has resigned.

W. H. Portner, Maytown, Pa., has become superintendent of the works of the Gadsden Car Co., Gadsden, Ala.

At a meeting of the board of directors of the American Locomotive Co., held June 21, L. A. Larsen was appointed assistant comptroller, effective July 1.

S. Montaner, commission agent, Barcelona, Spain, whose business includes hoops and bands, black and galvanized sheets and steam motor trucks, is now in the United States. On July 12 he leaves for Havana, and on July 25 sails for Spain.

J. Curthew Sanders of Stewart, Sanders & Co., bolt and nut manufacturers, Johannesburg, South Africa, is now in the United States. His New York address is care Herzfelder & Son, 6 Cliff Street.

Robert Wuest, for so many years prominent in the metal-working field as secretary and later as commissioner of the National Metal Trades Association, has recovered his health and has returned to active business. He has established insurance offices in the Union Trust Building, Cincinnati, and will engage actively in the field of group insurance.

R. A. Bull, who has been connected for the past year with the Chicago Steel Foundry Co., Chicago, has been elected vice-president and general manager of the Duquesne Steel Foundry Co., Coraopolis, Pa., and has entered upon his new duties. Mr. Bull was formerly president of the American Foundrymen's Association.

P. D. Murphy, for 13 years in the sales department of the Aluminum Co. of America, Oliver Building, Pittsburgh, has resigned. Effective Monday, July 16, Mr. Murphy will become general manager of sales of the Ridgely Trimmer Company, Springfield, Ohio, manufacturer of steel wool, largely used by painters, paper hangers and other craftsmen as a substitute for sand paper.

Joseph G. Butler, Jr., of Youngstown, Ohio, has written a 300-page book entitled, "A Trip Through France in Wartime" The book deals with the industrial, social and military conditions in Europe, and also refers to the great expansion that will come to the iron and steel industry in France when the war is over. The edition is limited to 200 volumes, which will be distributed to friends of Mr. Butler in this country and Europe.

Charles S. Clark, formerly sales agent of the Pennsylvania Steel Co., Boston, has been elected first vice-president and general manager of the Laconia Car Co., and will make his headquarters at Laconia, N. H., where the business of the company will be transacted hereafter. Mr. Clark has been well known to the New England railroad, electric railway and steel business men for many years.

George W. Armstrong is president of George W. Armstrong & Co., Inc., Fort Worth, Texas, the firm recently organized to take over the Texas Rolling Mill Co., Fort Worth, Texas, and the Osage Iron & Steel Co., Sand Springs, Okla. The other officers are: Barney Smith, vice-president and general manager; Rufus A. Colgin, second vice-president, and John F. Foster, secretary and treasurer.

E. T. Edwards, Columbia, Pa., is treasurer of the Eastern Bar Iron Institute, the organization of manu-

facturers of bar iron which operates under the Eddy system of open price competition, and which has an office at 103 Park Avenue, New York.

Standish Meacham, advertising manager of Rogers, Brown & Co., Cincinnati, has sailed from an Atlantic port for France, where he will serve as a secretary of the Army Young Men's Christian Association.

R. H. Parks of the Bettendorf Car Co., Davenport, Iowa, has been appointed operating manager of the Canadian Car & Foundry Co., Montreal, in charge of all its car plants. W. S. Atwood has been appointed assistant to the vice-president and manager.

C. Edwin Clarke formerly master mechanic of the Cambria Steel Co., Johnstown, Pa., is now chief engineer of the Wilmington Steel Co., Wilmington, Del.

Clifford B. Langstroth, supervisor of the heat-treating and drop-forge departments of the Ross Rifle Company, Quebec, has been appointed metallurgist with the Link-Belt Co., Indianapolis.

Gordon M. Campbell, manufacturing engineer, General Electric Co., West Lynn, Mass., has joined the Kerr Turbine Co., Wellsville, N. Y., as works manager.

Sir Robert Hadfield has had a baronetcy conferred on him by King George of England.

E. J. Parker, manager of the Morgan Engineering Co., has joined the staff of the Vulcan Steel Products Co., 120 Broadway, New York, as sales manager of the machinery and tool department. The company contemplates opening a chain of offices in Europe, China and Japan, and Mr. Parker will leave shortly for abroad to personally conduct this work.

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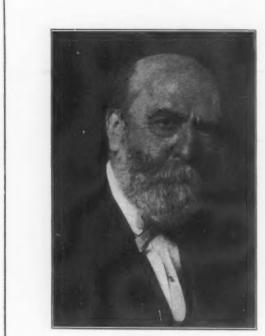
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OBITUARY

Frank Firmstone

The death of Frank Firmstone at Glendon near Easton, Pa., June 27, 1917, removes one who for a good many years was an important figure in the pig iron industry of eastern Pennsylvania. Glendon had been the family home for more than two generations. Frank Firmstone was born there Aug. 29, 1846, the son of William Firmstone, who was one of the first blast furnace operators to use anthracite in smelting iron ore. The Crane Iron Co. started the first furnace on the Lehigh River that made the manufacture of anthracite pig iron a commercial success. One year later the Glendon Iron Co. began using anthracite under the management of William Firmstone. Frank Firmstone, after his school training at Easton, went to Saunders Military Academy, Philadelphia, and in 1865 graduated from the Polytechnic College of Pennsylvania as a



FRANK FIRMSTONE

mining engineer. For 21 years he was connected with the Glendon Iron Co., at the death of his father in 1875 becoming general manager. He gave up the business in 1887 and later became associated with the Cranberry Iron & Coal Co., Cranberry, N. C., being president of that company for a number of years and a director in its subsidiary companies until his death. He was a director of the Longdale Iron Co., Longdale, Va., from its organization in 1870 until its dissolution in 1911 and in that period had intimate contact with blast furnace operations in Virginia.

Mr. Firmstone's contributions to the literature of blast furnace practice were mainly through the proceedings of the American Institute of Mining Engi-Particularly in the eighties and nineties he was an active participant in its meetings and discussions. He was a member, also, among other organizations, of the American Society for Testing Materials, the American Society of Civil Engineers, the American Society of Mechanical Engineers and the Engineers' Club of New York. At the request of THE IRON AGE, J. E. Johnson, Jr., has written the following estimate of Mr. Firmstone's work:

"Frank Firmstone's most active work as a furnace operator terminated 30 years ago when he resigned the management of the Glendon Iron Co., founded by his At one time Glendon was one of the great works of the Lehigh Valley and in fact of the country. He succeeded to the management when only 32 years old, and after his resignation in 1887 the works declined in importance, scarcely a trace being now visible where they once stood.

"Mr. Firmstone learned the blast furnace under the hard conditions prevailing when anthracite fuel with its slow rate of combustion was used to smelt the refractory magnetite ores of New Jersey, an operation which could only be carried on at a very slow speed. He was out of sympathy with the modern practice in harddriving which has developed from the use of coke fuel, high blast pressures and soft ores, so he retired from active service rather than adapt himself to conditions

which seemed wrong to him.

"Mr. Firmstone was a profound student with a brilliant mind and a retentive memory. His mind was a treasure house of information and one associated with him for many years has said that he had never known any other man to possess a mass of information so vast and at the same time so accurate, and that if Frank Firmstone made a statement it need not be checked up but could be accepted as a fact. This might well serve as the epitaph of this iron master, whose personality was so little known during his later life to the modern school of furnacemen."

WILLIAM C. SCOFIELD, Cleveland, for many years identified with the iron and steel industry in that city, died July 6, age 95 years. He was born in England and came to this country when 21 years of age. His first connection with the iron and steel industry was in 1872 when he purchased a controlling interest in the Otis Iron Co. that at the time was operating a bar iron mill on Whiskey Island, Cleveland, and changed the name to Lake Erie Iron Co. This plant was later sold to the Republic Iron & Steel Co. and finally dismantled. The present plant of the Lake Erie Iron Co. was built in 1878 and Mr. Scofield was president of the company at his death. Three sons were associated with him in the business, Frank R. Scofield, vice-president; Charles W. Scofield, secretary and treasurer, and G. F. Scofield. one of the directors.

CASIMIR VON PHILP, who had been connected with the Bethlehem Steel Co. at South Bethlehem, Pa., since 1890, died at Ocean City, N. J., July 5, following an attack of apoplexy. He was an engineer of unusual ability and originality. For a considerable period he was chief engineer of the Bethlehem company and in recent years was in charge of the machinery department. His inventions included improvements in rolling mills and special features of heavy forging equipment produced at the Bethlehem works. Sweden was his native country, but his ancestry was Scottish. 64 years of age. His society memberships included the American Society of Mechanical Engineers and the Engineers' Club, New York.

JAMES WHITEFIELD WOOD, a member of the firm of Tippet & Wood, Phillipsburg, N. J., manufacturers of boilers, tanks, etc., died June 25 at Easton, Pa., aged 72 years. He was a graduate of Lafayette College, a Civil War veteran, and director of the Eastern Trust

GEORGE MATHIOT ROBINSON, who had been connected with the Charter Gas Engine Co., Sterling, Ill., since 1871, died June 22, age 63 years. 1871, died June 22, age 63 years. Mr. Robinson was secretary of the company from 1877 to 1890 and president from 1890 to 1917.

JOSEPH V. KUNZE, vice-president of the Pelton Water Wheel Co., New York, and manager of its At-lantic department during the past 24 years, died at his home in Brooklyn June 27, after a brief illness.

HENRY C. RIKER, for over twenty-five years a highly esteemed representative of the Walter W. Woodruff & Sons Co., Mount Carmel, Conn., died at his home, Shelton, Conn., June 22.

Large Lake Ore Shipments in June

June shipments of iron ore from the Lake Superior region were 9,639,991 gross tons, exceeding the record amount for June, 1916, by 132,415 tons or 1.39 per cent. The comparative shipments by ports for June and for the season were as follows:

Escanaba	539,327 1,101,370 1,945,234 3,116,665	June, 1917 909,804 527,701 1,176,517 2,121,663 3,363,211 1,541,095	To July 1, 1916-2,602,824 1,154,140 2,204,263 3,878,915 6,325,990 3,449,435	To July 1, 1917 2,205,297 625,749 1,909,268 3,526,082 5,128,894 2,739,645
Totals		9,639,991		16,135,135
Increase, 1917 Decrease, 1917		132,415	*******	3,480,432

While June shows an increase over June, 1916, the total to July 1, 1917, is much below that for the same period last year because of the backward season early this year. The Duluth and Superior percentage this year was 53.64 against 52.01 last year. The Escanaba movement this year is 13.67 per cent, compared with 13.27 per cent last year. The percentages for Marquette and Two Harbors both fell off.

Left Large Bequest to Employees

John Bartlett Pierce, Peabody, Mass., vice-president American Radiator Co., who died June 23, expressed in his will, which was filed July 9 at Salem, his appreciation of the faithful services of about 400 of his older employees by distributing among them \$1,000,000 directly with the further provision that they shall receive 60 per cent of the income of a \$2,500,000 trust fund, this principal also ultimately to be distributed among them.

The employees who will enjoy these benefits are those who had been in the service of the company for 10 years or more before December, 1913, when the will was drawn. Limitations are placed on the amount, both as to income and principal, of the residuary estate each individual employee shall receive. The will provides that the surplus caused by this limitation is to be used to maintain the John B. Pierce Foundation for technical research in heating, ventilating and sanitation "to the end that the general hygiene and comforts of human beings and their habitations may be advanced."

Organizes New Company

Lewis H. Scurlock, vice-president, director and organizer of the M. & S. Corporation, Detroit, who has been actively identified in the development of the M. & S. differential, has retired from active participation in the affairs of the M. & S. Corporation, still retaining his interests and remaining vice-president of the corporation. He has organized The Krom-niK Gear Co., with a paid-up capital of \$50,000 and general offices at 1100 Karpen Building, Chicago, and taken over the exclusive distribution of the M. & S. differential, which will be manufactured by the M. & S. Corporation, as well as the exclusive distribution of Anderson rolled gears made by the Anderson patent machine process at Cleveland. The Krom-nik Gear Co. will act as the sales organization for both of these concerns. Fulton, vice-president of The Krom-nik Gear Co., has been long known to the automobile trade. J. S. Houston, secretary and treasurer of the company, has until recently been identified with large lumber interests.

The New York Air Brake Co., Watertown, N. Y., which has received a Government contract for the manufacture of 3-in. gun carriages, will erect a new manufacturing plant to provide for a large expansion in facilities. The new building will be of steel with concrete floors, 800 x 100 ft., and will be built by the Austin Co., Cleveland. The plant is to be completed within 60 days.

The Metal Block Corporation, 208 South La Salle Street, Chicago, has discontinued its plant at 2215 Ellston Avenue in that city and is operating its new plant at 1230 North Kostner Avenue.

Purchase of Kewanee Pipe Fitting Works

Financial journals have stated in the past week that arrangements have been completed through Hayden, Stone & Co. for the purchase by the Walworth Mfg. Co., Boston, of the Kewanee, Ill., plant of the National Tube Co. On behalf of the Steel Corporation it has been stated that negotiations looking to the acquisition of the Kewanee works by the Boston interests named have been in progress. The product of the Kewanee plant, which is chiefly pipe fittings and valves, the output being 28,000 tons of gray iron and malleable castings per year and 2600 tons of brass castings, complements to a considerable extent that of the Walworth Mfg. Co. The site at Kewanee contains 38 acres of land. buildings are modern and well equipped with laborsaving devices. About 2500 men are employed. The rolling mills formerly operated at the Kewanee plant by the Western Tube Co., which was the original company, were dismantled in 1908 and the tube mills in 1915 and 1916. The Walworth company was started in 1842 and was the first in the country to manufacture cast iron fittings. It was a pioneer in the installation of steam-heating plants and has been an important factor in the development of steam, water and gas material and fittings. The Stillson wrench is one of its products.

American Electro-Chemical Society Meeting

The thirty-second general meeting of the American Electro-Chemical Society will be held in Pittsburgh, A special feature of the meeting will be a series of papers and discussions on electro-chemical war supplies, and the part the electro-chemical industry will play in the war. The committee in charge is outlining a plan of technical sessions, visits to industrial plants and entertainment features. It invites the delegates to arrive in Pittsburgh on Wednesday, Oct. 3, so as to get together informally and enjoy some recreations which have been planned for them. Thursday, Oct. 4, will be held a regular meeting of the society in the morning, with optional excursions to industrial plants in the afternoon. In the evening an illustrated lecture on a semi-technical subject will be given. Friday, Oct. 4, a symposium on electro-chemical war supplies will be held in the morning, followed by excursions to industrial plants in the afternoon. A subscription dinner will be held at the William Penn Hotel in the evening, with special entertainment features. Saturday, Oct. 5, will be devoted to an all-day excursion, on a special train with complimentary luncheon, to several industrial plants in the Pittsburgh district.

Whitman-Bull Tractor Co. Formed

The Whitman-Bull Tractor Co., St. Louis, capitalized at \$1,250,000, has been formed to take over the Whitman Agricultural Co., St. Louis, and the Bull Tractor Co. and the Toro Motor Co., both of Minneapolis, Minn. The equipment of the two Minneapolis plants will be moved to St. Louis and housed in the Whitman plant. The new company will build tractors complete and will continue to make the Whitman line of farming implements. The capital stock of \$1,250,000 will be issued in the form of 8 per cent cumulative preferred stock and 12,000 shares of common stock of no par value will also be issued. P. J. Lyons, president Bull Tractor Co., will be president of the new company. The other officers will be: H. L. Whitman, St. Louis; James W. Lyons, Chicago, and P. H. Knoll, Minneapolis, vice-presidents; Lawrence B. Pierce, treasurer and chairman of the board of directors; H. L. Whitman, Jr., secretary and foreign sales manager. These men, with W. A. Bush, Isaac N. Orr and J. D. McCarthy, constitute the board.

The New Britain Machine Co., New Britain, Conn., will devote a large part of its equipment to the manufacture of anti-aircraft gun mounts for the Government. It has put its working force on an 8-hour basis and will take on several hundred new hands to fill the night shifts. It is also planning to make extensive additions to its plant.

Machinery Markets and News of the Works

MUNITIONS CONCERNS BUY

Need Tools on Big Government Orders

General Business Is Active—Shipyards Are Still Making Purchases—Japanese Government Buys Tools in This Country

Munitions contracts recently closed by the United States Government are having their effect on the machine-tool trade. Those concerns receiving contracts which were previously engaged on similar work for the Entente Allies require only a few tools for balancing up their equipment, but some of the orders received have been of good size. The Savage Arms Co., Utica, N. Y., has closed for a number of tools. This concern is making Lewis machine guns for the United States Government and the Allies and is said to have on hand orders aggregating \$30,000,000. Some of the other concerns which have received large munitions contracts recently are the Crucible Steel Co., the American Can Co., the Bartlett, Hayward & Co., the Consolidated Car Heating Co., the Westinghouse Electric & Mfg. Co., the East Jersey Pipe Co., the New York Air Brake Co., the American Car & Foundry Co., the Pressed Steel Car Co., the Worthington Pump & Machinery Corporation, the E. W. Bliss Co. and the Washington Steel & Ordnance Co. Considerable business is expected to follow the opening of a joint purchasing office at 50 East Forty-second Street, New York, by the Winchester Repeating Arms Co., the Remington-U. M. C. Co., Bridgeport, Conn., the Remington Arms Co. of Delaware, and the Peters Cartridge Co.

The Aircraft Production Board is going ahead with its plans for a big airplane fleet in anticipation of the passage by Congress of the bill appropriating \$639,000,000 for the purpose of training and equipping an army of 75,000 aviators. The Willys-Overland Co. is already at work to attain a production of 15,000 motors a year for training machines, and the Wright-Martin Co. is understood to be expecting a Government contract very soon. The development of a standard motor adapted for fighting airplanes is now being made the subject of special investigation. A heavy volume of inquiry for equipment for building airplane motors and other parts is coming from Detroit. The Nordyke & Marmon Co., Indianapolis, will build 1000 airplane motors within 90 days.

Shipyards strikes have had little appreciable effect on sales of equipment. The Newburgh Shipyards, Inc., with offices at 31 Nassau Street, New York, is equipping a yard at Newburgh, N. Y., to make standardized steel ships and is in the market for considerable equipment, including three locomotive cranes and an overhead crane equipment. The Staten Island Shipbuilding Co., 1 Broadway, New York, will soon close for one 75-ton crane, two 50-ton cranes and a 15-ton crane for its boiler shop. The Baltimore Dry Docks & Shipbuilding Co. has finished its extensive purchases, closing last week for boiler shop equipment. The Tebo Yacht Basin Co., Brooklyn, is equipping its yard for the building of

submarine chasers. The Government let many new contracts for chasers, about doubling the number which will be turned out within the next few months. The Fore River Shipbuilding Corporation, Quincy, Mass., has closed for the machine tools it recently inquired for. No time was lost, as the equipment was needed for urgent Government work. The Union Iron Works has closed recently for machine tools aggregating about \$400,000 in value. The orders were placed in the East, but the tools will be shipped to the Pacific Coast. The Newport News Shipbuilding & Dry Dock Co. will close for the remainder of its requirements this week.

The Japanese Government, through Commander Godo, 25 Madison Avenue, New York, has been making extensive purchases of machine tools for use in the Government munitions works in Japan. The Pennsylvania Railroad is expected to place an order this week for boiler shop equipment. The Midvale Steel & Ordnance Co. and the Cambria Steel Co. have been making purchases for several weeks past. The Chicago & Northwestern Railroad has placed orders for many of the tools it recently inquired for.

The Government last week closed contracts for 15 mine-storage buildings, and the contractors announced their need of 15 two-ton cranes. The Maryland Shipbuilding Co., Baltimore, is said to have abandoned its plan to buy six five-ton overhead traveling cranes owing to its inability to obtain early deliveries. Several other shipyards are understood to be planning the substitution of other methods of hoisting because of the sold-up condition of the crane-building plants. Eastern shipyards have placed many orders for locomotive cranes.

There has been a good demand the past week for twist drills and small lathes for export. A large number of machine tools purchased months ago for shipment to Russia have been turned back on the market.

On all purchases for the United States Navy, including those for the shipbuilding companies engaged on Government work, the Compensation Board of the Navy now requires of builders of machinery and machine tools a detailed statement showing why present prices of such equipment have advanced in price. The builders are required to justify their prices on the basis of increased costs of material and labor, giving facts and figures that bear out their explanations of the advances. It is understood that the Government is paying half the cost of new equipment required for Government work.

New York

NEW YORK, July 9

Fire, June 27, at 401-407 Mulberry Street, Newark, N. J., partially destroyed the works of W. J. Bailey & Co., manufacturers of tools, William Link & Co., manufacturers of jewelry, and the H. J. Ruesch Machine Co., operating a machine shop for the manufacture of metal specialties.

The Lidgerwood Mfg. Co., Frelinghuysen Avenue and Peddie Street, Newark, N. J., manufacturer of heisting machinery, will build a new one-story machine shop, about 30 x 125 ft., to cost \$7,000.

Edmund Jost's Sons, 48 Dickerson Street, Newark, machinists, specializing in the manufacture of metal goods, will erect a new one-story machine shop, 40 x 100 ft., at 58-60 First Street, to cost \$9,000.

The American Handikit Co., Inc., Newark, has leased property at 112-116 Arlington Street and will establish a plant for the manufacture of small tools.

The Hanson & Van Winkle Co., 269 Oliver Street, Newark, manufacturer of dynamos and kindred specialties, has filed plans for a new two and one-half story factory, 46 x 50 ft., at Adams and Chestnut streets, to cost about \$15,000.

Benjamin E. Jarvis, Newark, operating a pattern making plant at 113 Mechanic Street, has been incorporated under the name of Benjamin E. Jarvis, Inc., with capital of \$50,000 for business expansion. Other incorporators are J. T. Clark and L. C. Lotz.

A power house to cost about \$14,000 will be constructed by the Alcohol Products Co. at its new refining plant to be erected at Blanchard Street and the Passaic River, at a cost of about \$70,000.

The International Arms & Fuse Co., Grove Street and Bloomfield Avenue, Bloomfield, N. J., is planning for the installation of new automatic screw machinery.

In connection with the proposed rebuilding of the plant in the Kingsland section, Lyndhurst, N. J., of the Canadian Car & Foundry Co., 165 Broadway, New York, Joseph A. Evans, lessee of the plant, will equip the works for shell loading operations to handle Government work. The Ordnance Department, Washington, urged the immediate reconstruction of the plant.

The Babcock & Wilcox Co., East Third Street, Bayonne, N. J., has commenced excavations for the proposed new machine works, 150×400 ft., for the construction of marine boilers.

The New Jersey Acetylene Cutting & Wrecking Co., Bayonne, has been organized to operate a plant at 15-19 John Street for cutting and working steel and iron. Samuel and Max Levine head the company.

The Lehigh Valley Railroad, Washington Street, Jersey City, N. J., is said to be having plans prepared for the erection of a new car shop at its works at Perth Amboy. It will be equipped to specialize in locomotive repairs as well as general car work and will include an electric crane for locomotive handling.

The General Bakelite Co., Perth Amboy, N. J., and 2 Rector Street, New York, manufacturer of insulation specialties, will build a three-story addition, 50 x 75 ft., to cost about \$20,000.

Van Allen's Convertible Automobile Body Co., 133 Broadway. Paterson, N. J., has been incorporated with a capital of \$50,000 to manufacture automobile bodies. Charles H. Van Allen, Alfred H. Post and Alfred H. Post, Jr., are the incorporators.

The Industrial Service Co., Lincoln, N. J., is reported to be planning for the purchase of new locomotive cranes, 15 to 25 tons capacity.

Albert Palmer, Madison, N. J., and associates, have incorporated in Delaware the Washburn Wire Co., with capital of \$1,000,000 to manufacture iron, steel, copper and other kinds of wire. Frank R. Series, East Orange, and George F. Handell. Montclair, are other incorporators.

The Aeromarine Plane & Motor Co., East Keyport, N. J., has commenced operations at its new plant for the production and assembling of aeroplanes. It is planning for the immediate erection of an addition.

The Aborn Steel Co., 105 Leroy Street, New York, has acquired about 25 x 90 ft., at 22 Clarke Street, for the erection of a one and two-story building to cost \$10,000.

The Bacon Engineering Co., New York, has been incorporated with a capital of \$10,000 to manufacture automatic machines and engage in allied engineering work. S. H. and M. Wishnew, 406 Pulaski Street, Brooklyn, are the incorporators.

The Sperry Gyroscope Co., 40 Flatbush Avenue Extension, Brooklyn. N. Y., manufacturer of gyroscopes, etc., has awarded a contract for the construction of an 11-story and basement, reinforced-concrete addition to its plant, 100 x 110 ft., at the Manhattan Bridge Plaza.

The Ridgway Steel Products Corporation, New York, has been incorporated with a capital of \$10,000 to manufacture from and steel specialties. E. G. Wood, A. B. Romen and C. Stahl, 11 East Forty-fifth Street, are the incorporators.

The Lowry-Knise Tool Co., Syracuse, N. Y., has been incorporated with a capital of \$10,000, to manufacture tools, dies and machinery. The incorporators, all of Syracuse, are E. N. Lowry and E. E. and A. E. Knise.

The W. A. Mills Brass Co., Port Chester, N. Y., has been incorporated with a capital of \$25,000 to manufacture brass, ropper and other metal goods. W. A. and W. A. Mills, Jr., and C. W. Stevens are the incorporators.

The George Schautz Engineering Co., Buffalo, has been incorporated with capital of \$30,000 to manufacture cranes

and parts. George and J. A. Schautz and F. J. Leuthner, Buffalo, are the incorporators.

The Buffalo Pressed Steel Co., Inc., Buffalo, has increased its capital from \$30,000 to \$75,000.

Cousins & Son, 73 Washington Street, Buffalo, manufacturers of boilers, tanks, stacks, etc., have incorporated under the name of the J. D. Cousins & Sons Boiler Works, with capital of \$50,000. J. D., L. A. and J. Cousins are the incorporators.

The Bayonne Nut & Bolt Co., Bayonne, has purchased additional machinery for an extension to its plant, to be completed and in operation in the fall.

The B. Meyerovich Engineering Co., Moscow, Russia, has opened a branch office at 1675 Broadway, New York, and is in the market, according to its representative, for large quantities of machinery, tools and metals. The aim of the New York branch is to further the distribution of American machinery and tools in Russia. Mr. Meyerovich, chief engineer, intends coming to this country soon to extend the company's business.

The Caledonia Bean Harvester Works, Caledonia, N. Y., has had plans prepared for a foundry, 70 x 100 ft., one story. W. H. Brownell is manager,

A boiler house to cost \$15,000 is to be erected by the Fabrikoid Co., Newburgh, N. Y.

Burdick & Son, Inc., 72 Hamilton Street, Albany, will erect two additions to its factory, 66 x 120 ft. and 66 x 70 ft., four stories and basement, to cost \$40,000.

New England

BOSTON, July 7.

It is becoming more evident day by day that New England is destined to play an important part in the munitions business of the United States. There is little being said about munition contracts, but one by one various plants are being expanded to take care of the business placed by the Government. Machine tool builders and their agents have a large number of proposals all figured for various plants in New England, but the Government's delay in placing orders has in some cases held up these proposals so long that the agents have been compelled to withdraw them. The total business, present and prospective, is enormous, and it is a big question if even extreme measures to overcome the labor shortage will enable the manufacturers to produce machine tools as fast as needed. Government work, direct and indirect, is getting the preference everywhere, and private customers are accepting the situation with little complaint. The Fore River Shipbuilding Corporation is reported to have closed for the entire list issued a short time ago.

The New Britain Machine Co., New Britain, Conn., has accepted a direct contract from the War Department to manufacture anti-aircraft gun mounts. It is reported that this contract totals nearly \$2,000,000 and the company is starting to expand its plant greatly in order to fill the contract.

The General Electric Co. will move its fan motor department from Pittsfield, Mass., to Watsessing, N. J., in the fall. It is understood that the scarcity of labor has been one factor in bringing this change about.

The New England Power Co., which now has several electric plants in operation in the Connecticut and Deerfield valleys, is planning an expenditure of \$7,000,000 for a 112,000,000-kw,-hr. electric power plant on the Deerfield River at Readsboro, Vt.

The Carver Cotton Gin Co., East Bridgewater, Mass., has been incorporated with authorized capital stock of \$600,000. The directors are Henry F. Knight, president; Arthur F. Johnson, 50 State Street, Boston, secretary; and H. W. King.

The Bristol Brass Co., Bristol, Conn., is building a one-story addition, 50×120 ft. This addition will be used temporarily for storage purposes, but later will form a part of the casting shop.

The Auto Parts Mfg. Co., Waltham, Mass., has been incorporated with authorized capital stock of \$50,000. The directors are Charles J. Batcheller, president; John Wylie, Lynnfield Centre, treasurer, and H. W. Batcheller.

The Rimmon Eyelet Co., Seymour, Conn., has awarded a contract for a two-story factory, 50×125 ft.

The Dighton Furnace Co., Chelsea, Mass., has been incorporated with authorized capital stock of \$25,000. The directors are John H. McNary, 17 John Street, president and treasurer; G. M. Hallahan and A. M. Peirce.

The North & Judd Mfg. Co., New Britain, Conn., is having plans figured for an addition, 70 x 150 ft., one story.

The Hope Foundry Co., Cranston, R. I., has been incorporated with authorized capital stock of \$30,000. The incorporators are John E. Costello, 1045 Elmwood Avenue,

Providence; Edward J. Magee, Providence, and Richard S. Smith. Warren.

The Fafnir Bearing Co., New Britain, Conn., has awarded a contract for an addition 50 x 80 ft., one story.

The Cumberland Shipbuilding Co. has been organized at Portland, Me., with the following officers: James C. Hamlen, president; James C. Hamlen, Jr., vice-president; Seth A. Moulton, general manager. The company proposes to build 2000-ton ships at South Portland.

The New Britain Machine Co., New Britain, Conn., which has accepted a large contract to make anti-aircraft gun mounts, is adding two stories to a five-story building, 38×260 ft., and is to add three stories to a four-story building, 55×380 ft., which is now under construction.

The Turner & Seymour Mfg. Co., Torrington, Conn., has awarded a contract for an addition to its foundry, $50~\mathrm{x}$ 150 ft.

The Smith & Wesson Co., Springfield, Mass., has begun the erection of a five-story addition, 60 x 200 ft.

The S. A. Woods Machine Co., South Boston, Mass., Is having plans drawn for a one-story addition, 90 x 100 ft.

The General Electric Co. has awarded a contract for the erection of a four-story foundry, 80×340 ft., on Porter Street, East Boston.

The Acme Stamping Co., Torrington, Conn., has been incorporated with authorized capital stock of \$20,000 by Morris Weiss, James D. Hutton and Michael S. Cimmino.

The Miamus Motor Works, Stamford, Conn., has awarded a contract for a one-story addition, 42×66 ft.

The Anderson Die Machine Co., Bridgeport, Conn., has increased its capital stock from \$25,000 to \$50,000.

Sargent & Co., New Haven, Conn., have awarded a contract for an addition, 228 x 314 ft., one-story.

The Warren Steam Pump Co., Warren, Mass., has awarded a contract for a one-story addition, 64 x 105 ft.

The Scovill Mfg. Co., Waterbury, Conn., has awarded a contract for a pattern building, $\Im 2 \times 216$ ft., four stories.

Philadelphia

PHILADELPHIA, July 9.

The Scott Paper Co., Seventh and Glenwood avenues, Philadelphia, has commenced the erection of a new three-story building at Chester, Pa., 70 x 156 ft. to comprise the final unit of recent extensions to its factory. E. I. Scott is president.

The Demas Armor-Cased Tire Saving Co., Philadelphia, has been incorporated with a capital of \$200,000 to manufacture tires and special tire casings. George H. B. Martin, Philadelphia, and S. C. Seymour, Camden, N. J., are the incorporators.

The H. Belfield Co., 435 North Broad Street, Philadelphia, manufacturer of steam fittings, plumbers' supplies, etc., has acquired property at Cambria and Twentieth streets, about 275 x 300 ft., and is said to be planning to use the site for extensions.

George W. McKonn and J. F. Cushman, Philadelphia, have organized a company to construct and operate a shipbuilding plant near Wilmington, N. C. Property has been acquired on the Cape Fear River for the proposed works.

The Plexus Tire & Rubber Co., Philadelphia, has awarded a contract for the erection of a new one-story plant, about 50 x 130 ft., at State Road and Levick Street to cost \$20,000.

The Bound Brook Engine & Mfg. Co., Philadelphia, has been incorporated with a capital of \$300,000 to manufacture engines and kindred equipment. Root C. Finder, H. Wolfenden and Wray C. Arnold, Philadelphia, are the incorporators.

The Pennsylvania Equipment Co., 1438 South Penn Square, Philadelphia, is said to be in the market for a number of marine engines of different types and sizes for vessels now being constructed for the Emergency Fleet Corporation.

The Bernstein Mfg. Co., Ford St., Philadelphia, manufacturer of iron and steel products, is taking bids for the erection of an addition to its plant at Third Street and Allegheny Avenue.

S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturers of wire goods, will erect an addition to their plant.

The American Bridge Co., Trenton, N. J., is said to be planning for additions to its plant to cost about \$1,000,000, to be used in shipbuilding operations, a new department which has been inaugurated by the company. The proposed buildings will be located at South Trenton, and will be equipped to specialize in barges and boats of kindred type.

The Camden Forge Co., Elm Street, Camden, N. J., specializing in the production of iron and steel forgings, has increased its capital from \$100,000 to \$500,000.

The Atlantic City Steamship & Terminal Co., Atlantic City. N. J., has been incorporated with a capital of \$300,000 to construct a shipyard. C. H. Jeffries, L. D. Alger and G. S. Brooks are the incorporators.

The Chester Shipbuilding Co., Chester, Pa., is reported to be planning for the construction of a new shipbuilding plant near Savannah, Ga. C. M. P. Jack is general manager.

The United States Gauge Co., Sellersville, Pa., manufacturer of gages, etc., is having plans prepared for a three-story addition, about 50 x 50 ft.

The Miller Auto Co., Harrisburg, Pa., has been organized by W. H. Miller, B. F. Barker and A. H. Snyder to manufacture automobiles, motor trucks and parts.

The Traylor Engineering & Mfg. Co., Allentown, Pa., is arranging for the immediate construction of marine engines, boilers and kindred equipment of 1400 hp. capacity for the ships to be built at the works of the Traylor Shipbuilding Co., Cornwells, a subsidiary organization. The company will build ten vessels, to be completed early in 1918.

The Crown Smelting Co., Concord Avenue and Patterson Street, Chester, Pa., specializing in the production of babbitt metal and brass specialties, is building a two-story addition to its main plant.

The Lancaster General Hospital, Lancaster, Pa., is planning for the erection of a new electric power house, at a cost of about \$18,000.

The Greenough Coal Co., recently organized by Thomas J. Mitchell, Uniontown, Pa., and associates, is said to be planning for the installation of an electric power plant on its properties at Hellier, Ky.

The Leetsdale Foundry & Mfg. Co., Leetsdale, Pa., a Delaware corporation, has increased its capital from \$30,000 to \$80,000.

The Donaldson Iron Co., Broad Street, Emaus, Pa., manufacturer of iron pipe and tubing, has increased its capital from \$200,000 to \$400,000. It is reported that the company plans for expansion. John D. Ormrod is president.

The Brinton Motor Truck Co., recently incorporated for \$20,000, has opened an office at 5740 Cherry Street, Philadelphia.

Baltimore

BALTIMORE, MD., July 9.

The Maryland Brass & Metal Works, Guilford Avenue and Federal Street, Baltimore, will build a two-story, 46 x 88-ft. addition. William Gisriel, Jr., is president and general manager.

C. H. Crook, 28 Light Street, Baltimore, is interested in a shipbuilding plant to be established in Baltimore. It is understood that a large tract of land on deep water adjoining part of the property of the Baltimore Dry Docks & Shipbuilding Co. has been taken over. The McLean Contracting Co., foot of East Fort Avenue, O. B. Coblentz, president, also is understood to be interested.

The Baltimore Gas Appliance Co., Bayard and Hamburg streets, Baltimore, Md., has awarded a contract for the erection of a new one-story plant on South Carey Street as an extension to its works.

The Black & Decker Mfg. Co., 105 South Calvert Street, Baltimore, Md., manufacturer of electric drills, air compressors, etc., is taking bids for the erection of the first unit of a new machine works and plant to be erected at property recently acquired at Towson, Md. The structure will be one story, 60 x 200 ft. Herman F. Doeleman, American Building, is engineer.

The McNamara Brothers Co., Ransteads Wharf, Baltimore, Md., manufacturer of boilers, tanks, etc., is taking bids for the erection of a new two-story plant, 80 x 160 ft., on South Bush Street.

The Southern Railway Co. is building extensions to its car repair works at Spencer, N. C., to provide for a total capacity of 225 cars. The additions consist of a one-story shop building, 50 x 100 ft., and shed 600 x 900 ft. It is said that the new machinery to be installed will be operated with individual motor drive.

The Terminal Shipbuilding & Engineering Corporation, Norfolk, Va., has been incorporated with a capital of \$100,000 to construct and operate a local shipbuilding plant. G. Vernon Meakin is president.

The Union Truck Co., Morgantown, W. Va., has been incorporated with a capital of \$25,000 to manufacture motor trucks. C. C. Brown, M. L. Clovis and E. M. Everly, Morgantown, are the incorporators.

The Richmond Foundry Mfg. Co., Richmond, Va., has increased its capital from \$100,000 to \$400,000.

Chicago

CHICAGO, July 9.

Orders placed by the Chicago & Northwestern Railroad against its list of approximately 100 tools made the week good one with several of the dealers, especially those who did not withdraw their quotations following the recent advance in prices. Others foresaw the advance and made their quotations sufficiently high to cover themselves.

Much comment is heard concerning the greatly lessened operations of the makers of pleasure automobiles, which, in turn, affect the manufacturers of parts. Foundries which specialized in automobile castings are slowing up to an extent which forces them to let men go, and in one instance a capable foundry foreman is looking for another position. While the truck business can replace the pleasure car activity to a considerable extent, it is realized that there are a great many parts and attachments used in pleasure cars that are not needed on automobile trucks, also that firms which have not specialized on the latter cannot always easily switch over to their manufacture.

Munitions manufacture appears to be making small headway in this section, but it is expected to quicken before long. A local valve manufacturing company has a contract for turning out 330,000 small shells, and will strive to complete the order in five months, with the assistance of sub-contractors. The company has been productive of fairly good orders for machine tools.

As a result of large orders placed in the East, deliveries on both large and small turret lathes of some makes have been pushed ahead. Inquiries continue to be received from both the Atlantic and Pacific coasts for machines needed by shipbuilders, the greater demand coming from the Pacific.

Extensions to industrial plants are more numerous than in previous months. Reinforced concrete is used almost invariably because of the scarcity of structural steel.

The International Airship Corporation, 36 South State Street, Chicago, is soon to begin work on a one and two-story reinforced concrete and steel factory, 100 x 600 ft., to cost about \$100,000. Three hangars, each 80 x 100 ft., mostly of wood, are also to be constructed. W. H. Pruyn, architect, 122 South Michigan Avenue, will award the contracts.

The Felt & Tarrant Mfg. Co., Chicago, manufacturer of comptometers and calculating machines, will erect a five-story reinforced concrete addition, 45 x 75 ft., to its plant in North Paulina Street. Bids will be taken by L. G. Hallberg & Co., 116 South Michigan Avenue.

The Patent Vulcanite Roofing Co. will erect a one-story mill construction addition, 140 x 170 ft., to its plant at 2529-2543 West Forty-eighth Street, Chicago, at an estimated cost of \$70,000.

The general contract has been awarded for another story to a three-story machine shop, 50 x 125 ft., for the Elmes Engineering Co., 216 North Morgan Street, Chicago.

Plans have been prepared for an additional story, 45 x 95 ft., to a pump building at 136th Street and Brandon Avenue, Hegewisch, for the Western Steel Car & Foundry Co., to cost over \$8,000.

The general contract has been let for a three-story manufacturing building, 55 x 120 and 69 x 82, for G. M. Marks, 1239 to 1243 West Madison Street, Chicago.

Plans for a machine shop, 75 x 130 ft., have been prepared by L. H. Bronson, 842 Kinzie Street, Chicago.

The C. H. Hansen Co., 178 North Clark Street, Chicago, is planning to build a three-story addition, 50×100 ft., to its factory, at an estimated cost of \$25,000.

The Pan-American Motor Co., Decatur, Ill., is planning the erecting of a factory to cost \$30,000.

An addition, 100×750 ft., will be built by the Universal Tractor Co., Waukegan, Ill.

It has been reported that the L. Wolff Mfg. Co., Chicago, manufacturer of plumbing supplies, would remove its plant to Michigan City, Mich. The company states that while it has purchased land in Michigan City, and may eventually build, there is no justification at this time for saying that the entire plant will be removed from Chicago.

The Standard Spiral Pipe Works, Chicago, which recently suffered a heavy loss due to a fire which destroyed its entire plant, has rebuilt, new machinery is being installed, and work will be resumed soon. The company is also erecting a building more than twice as large as the original, in which will be installed, besides an additional pipe shop, a forge department, 75 by 150 ft., which will have an equipment of 20 hammers, both board and steam drop; also buil dozers and Bradley hammers.

Milwaukee

MILWAUKEE, WIS., July 9.

In the absence of expected developments relative to Government buying of machine tools, local tool builders continue in a state of suspense, but at the same time are using every effort to produce and deliver existing bookings which, added to new orders, will keep local shops fully occupied long past the end of the year. While immediate business is good, it is without feature, and shows little change from the conditions in recent weeks. Orders come from all parts of the country, and from practically every division of the metal-working industry. The Pacific coast, which has become an important buying factor, continues to place a fair amount of business in small lots. The volume and nature of inquiries received indicate a large amount of business in sight.

The Milwaukee Electric Crane & Mfg. Co., Milwaukee. Sixtieth and Greenfield Avenues, West Allis, formerly owned by the Fred M. Prescott Steam Pump Co., has reached full capacity production, and is making regular deliveries. A large volume of orders is being booked from all parts of the United States and Canada, for overhead electric traveling cranes of from 2 to 100 tons' capacity, single line grab buckets, and electric hoists.

The Killen-Strait Tractor Co., Appleton, Wis., manufacturer of gas engines, tractors, etc., expects to complete work this week on its new foundry, 48 x 70 ft., which will provide facilities enabling the company to manufacture all of its own castings. Heretofore the heavier castings were purchased from outside foundries.

The Lipman Refrigerator & Car Mfg. Co., Beloit, Wis., will award contracts within the next 10 days for the erection of the first units of its proposed plant for the manufacture of refrigerator cars and the installation of refrigerating systems in old cars. The initial expenditure will be about \$50,000. Plans have been prepared for a machine shop, foundry, sheet metal shop and office building and track storage sheds.

W. S. Blachley, Kilbourn, Wis., operating a machine and automobile repair shop, has erected a 40 x 100-ft. addition, and will install additional equipment.

The Appleton Auto Body Co., Appleton, Wis., which established a plant at Fremont and Jefferson Streets in leased quarters in February, is having tentative plans prepared for a manufacturing plant, with wood and metal-working shops, to be erected during the fall and winter C. C. Seeger is vice-president and general manager.

Detroit

DETROIT, July 2.

It is stated that Detroit will receive about 60 per cent of the \$600,000,000 the Government will spend for airplanes, and the large automobile factories are preparing for big orders. Jobbers report many inquiries of unprecedented size on special machines and manufacturers are planning to change their equipment to make munitions and war material.

Deliveries are slowing up and quotations being made on next year's delivery of lathes and milling machines, which are hardest to get. Drill presses are also quoted for longtime delivery. Grinders are more easily obtainable.

Automobile companies report a good business, with nearly a normal demand in pleasure cars. Labor is well employed at high wages, with a shortage in skilled lines.

The U. S. Pressed Steel Co., Ypsilanti, Mich., is laying the foundation for another extension to its plant.

The Samson Trailer Co., Grand Rapids, Mich., organized some time ago to manufacture auto and tractor trailers, has been incorporated with a capital stock of \$150,000. Frank T. Hulswit and David A. Warner are stockholders.

Dodge Brothers, Detroit, manufacturers of automobiles, are taking bids for the erection of a seven-story brick and concrete addition to their plant, about 165 x 275 ft. Smith, Hinschman & Grylls, Detroit, are the architects.

The Hayes Motor Truck Wheel Co., St. Johns, Mich., is planning to increase its equipment to manufacture 500 wheels a day instead of 200.

The Hamilton Motors Co., Grand Haven, Mich., has about completed its factory buildings and will shortly turn out trucks in large numbers. It is capitalized at \$500,000.

The Napoleon Motor Co., Napoleon, Ohio, is removing its plant to Traverse City, Mich., where it will manufacture pleasure cars and motor trucks.

The Leonard Tractor Co., Jackson, Mich., has begun business with a capital of \$1,000,000 common and \$500,000 preferred stock of which \$1,000,000 has been subscribed.

It is announced that the Metzger Register Co. will remove from Elkhart, Ind., to Grand Rapids, Mich. Leroy Metzger is head of the company, which is capitalized at \$50,000.

The General Machine & Tool Co., Jackson, Mich., has been incorporated with a capital stock of \$24,000 to manufacture machinery and tools. Among the incorporators are Louis Paul, P. W. Rogers and J. W. Myers.

Cleveland

CLEVELAND, July 9.

There is a heavy volume of inquiry for equipment for building airplane motors and other parts, much of this coming from Detroit. One inquiry from this source is for forty-three turret lathes for work on airplane engines. It is understood that two types of engines for airplanes will be built in Detroit, one by a leading automobile company and another by a new company that is being formed, and in which Henry M. Leland and his son, Wilfred C. Leland, formerly of the Cadillac Motor Car Co., are interested. There is a good demand for both turret lathes and automatic screw machines, about one-half of the inquiries being for machines for Government work.

While machine tool builders generally report a good volume of business, the market has quieted down among dealers the past few days, both in volume of orders and inquiries. Sales have been confined largely to single machines and small lots. Inquiries have fallen off, and practically no inquiry of any size has come out. Considerable business. however, is pending in inquiries that developed during the previous week or two.

There is a heavy demand for locomotive cranes from Eastern shippards, one of which has placed orders with a Cleveland manufacturer for 16 cranes.

Bardons & Oliver, Cleveland, have withdrawn all prices on their line of turret lathes. This firm has not definitely decided what its advance will be, but in the meantime is making quotations at about 11 per cent above its recent prices.

The Cleveland Pneumatic Tool Co., which is building a new plant, is in the market for equipment, including lathes, shapers, and milling and drilling machines. No formal list has been prepared, but a number of machines will be required.

The Cowles Tool Co.. Cleveland, recently organized, will manufacture milling cutters, and later will add reamers to its ine of products. The company is building a plant at 2086 West 110th Street. E. A. Cowles is president.

The Simplex Cable Hoist Co., Cleveland, has been incorporated with a capital stock of \$10,000 by H. C. Quigley and others, to make hoisting machinery.

The Wellman-Seaver-Morgan Co., Cleveland, has recently taken orders for two car dumpers, one for the Brier Hill Steel Co., and the other for the Utah Copper Co.

Plan have been prepared by the Forest City Engineering Co. for a new plant, one story, 60 x 200 ft., to be erected at East 152d Street and St. Clair Avenue, Cleveland, by the Blomquist-Eck Machinery & Mfg. Co. It will install about \$20,000 worth of new machinery, orders for most of which were placed some time ago.

The Anderson Mfg. Co., Elyria, Ohio, has been incorporated with a capital stock of \$25,000 by A. G. Anderson and others, to manufacture tools and dies, succeeding the Cleveland Die Tool & Engineering Co. The new company was made to effect a change in the name which was given to the former company before its removal from Cleveland to Elyria.

Cincinnati

CINCINNATI, July 9.

A number of Government contracts that have been let to Dayton, Ohio, firms for die work have caused a good demand for shaping machines. The foreign call for machine tools continues good, but shipments are being made only to France and England. There is also quite a demand from these countries for portable electric tools. The Government has also placed a number of orders for portable electric drilling machines, the latest one reported having been received by the Standard Electric Tool Co., Cincinnati, covering 35 of its standard ½-in. machines.

Sawmill equipment is in good demand, especially in the South. Internal combustion engine makers are busy. The high cost of boilers has caused the substitution of gas engines instead of steam engines in a large number of instances. The report that a Hamilton, Ohio, firm had received an order for a large number of marine engines is denied.

The Cincinnati Bickford Tool Co., Oakley, Cincinnati, has added an extension to its plant, 30 x 125 ft., which will be used principally as an assembling department. Later the company plans to make an addition to its main shop. A. H. Tuechter is president.

The Cisco Machine Tool Co., Cincinnati, will build an addition, 59 x 200 ft., two stories. G. Mil Horton is general manager.

The Fosdick Machine Tool Co., Cincinnati, is making an addition to its plant at Northside that will largely Increase its capacity. N. B. Chace is general manager.

The Dayton Stamping & Tool Co., Dayton, has been incorporated with \$250,000 capital stock by James G. Mitchell, Frank Moeschl, and others. The company, heretofore operating under a partnership agreement, will remove its plant to 348-352 Xenia Avenue. It has lately received a Government contract

The Ohmer Fare Register Co., Dayton, expects to extend its plant in Edgemont.

The Pasteur-Chamberland Fliter Co., Dayton, has recently received a Government contract for electric searchlights, and is adding to its plant in North Dayton.

The Hampton-Scott Co., Columbus, Ohio, is building an addition to its plant in Grove City suburb, 50×150 ft., two stories. It manufactures metal specialties.

The Banner Pattern Works, Columbus, Ohio, whose plant was recently destroyed by fire, has secured quarters in the former Born bottling plant. The Franklin Die & Tool Co. will also remove to the same building.

The Hill Pump Co., Anderson, Ind., will erect an addition to its plant, $44\ x$ 97 ft., one story.

The American Safe & Lock Co., Anderson, Ind., has plans under way for a foundry addition.

On July 1 fire damaged the plant of the Union Light, Heat & Power Co., Newport, Ky., causing an estimated loss of \$25,000, mainly to the supply house. The machinery was only slightly damaged.

The Ironton Punch & Shear Co., Ironton, Ohio, is in the market for a 60-in. or 72-in. boring mill, similar to the Fosdick type.

Indianapolis

INDIANAPOLIS, July 9

The East Chicago Foundry Co., East Chicago, Ind., has been incorporated with \$30,000 capital stock to manufacture iron and steel products. The directors are Harry C. Stuart, Henry S. Evans and William F. Graver.

The Grapho-Metal Packing Co., Indianapolis, has been incorporated with \$15,000 capital stock to manufacture machinery. The directors are Egbert M. Hamlet, James Ostrander and Albert M. Bristor.

The Highway Iron Products Co., Indianapolis, has been incorporated to manufacture road machinery. The directors are Hubert Loeser, M. L. Joseph and C. V. Joseph.

The Beatty Machine & Mfg. Co., Hammond, Ind., has been incorporated with \$250,000 capital stock to manufacture machinery. The directors are William R. Beatty, P. H. Joyce, H. J. Cassady, John E. Fitzgerald and H. J. Aaron.

The James H. Johnson Co., Indianapolis, has been incorporated with \$20,000 capital stock to manufacture gasoline saving devices. The directors are James H. and George W. Johnson, Bullochville, Ga., and Thomas H. Johnson, Shiloh, Ga.

The Central South

LOUISVILLE, KY., July 9.

General business is good, with oil well and coal mining interests active buyers of supplies and equipment. Several railroad construction projects are to open. Local building operations have fallen off temporarily, although construction work on additions to factories is going forward.

The Dow Wire & Iron Works, Louisville, is going rather extensively into the manufacture of automobile accessories

The Roy C. Whayne Supply Co., Louisville, is in the market for an Austin or Parsons trench machine to cut 6 ft. deep, 36 in. wide; also a machine to cut 13 ft. deep and 40 in. wide.

The Riddle Coal Co., Chattanooga, Tenn., is in the market for used electric trolley or storage motors, 36 and 42-in. gage, in good condition.

The John G. Duncan Co., Knoxville, Tenn., is in the market for a second-hand, left-hand Corliss engine, 22 x 42,

heavy duty preferred, in good condition, for immediate delivery; second-hand hoisting engine, steel derrick, with bull wheel; iron planer, 4 or 5 ft. between housings, 10 or 12 ft. long and 4 or 5 ft. high; second-hand gasoline engine, 30 or 40 hp.; hoisting engine, with two cylinders and drum, to carry 600 ft. of %-in rope; 10-hp. John F. Byers single cylinder, double drum hoisting engine and boiler; and dealers' prices on second-hand rail straightener, immediate delivery.

Birmingham

BIRMINGHAM, ALA., July 9.

An active demand exists in practically all lines of iron and steel and woodworking machinery and for equipment for coal mines, lumber mills and graphite plants. Dealers are more concerned with delivery than anything else.

Announcement of the specific placement of \$11,000,000 to be devoted to plant extension at Birmingham by the United States Steel Corporation is expected in part or whole at an early date.

W. F. Owen, president Gulf, Mobile & Northern Railroad, announces that the board of directors have voted \$1,000,000 for dock improvements at Choctaw Point, Mobile, similar to the Bush terminals in Brooklyn.

The Jeffris Lumber Co., Jeffris, La., will build a mill with dry kilns and manufacture wirebound boxes and veneer. The plant will cost \$300,000. The company has connection with Armour & Co., Chicago.

The United States Maritime Corporation, Brunswick, Ga., has been organized with capital stock of \$2,500,000 to build ships for the Government. Stockholders of the Freighters' Ship Construction Co., Stonington, Conn., are interested.

R. J. Edenfield, Augusta, Ga., and W. E. Moore & Co., Pittsburgh, engineers, have obtained a franchise and propose to build a hydroelectric plant near Augusta, Ga.

St. Louis

ST. LOUIS, July 7.

There are indications of improvement in the demand for machinery, though dealers would scarcely become enthusiastic over any increase, as they are hard put to it now to satisfy customers on deliveries, which are becoming more extended. This section is only feeling the pressure for shipbuilding tools in an indirect manner, and local industries continue to wait for more definite tendencies before contracting for replacements on extensions. Operations, however, continue at a high level.

The Mid-West Mfg. Co., St. Louis, has been incorporated with a capital stock of \$20,000 by C. A. Rising, Charles J. Benson and Edward D'Arcy, to manufacture machinery.

The Wielandy-Reller Auto Equipment Co., St. Louis, has been incorporated with a capital stock of \$20,000 by Frank H. Wielandy, Paul J. Wielandy and Oliver A. Reller to manufacture automobile equipment.

The Planters' Gin Co., Crawfordsville, Ark., has been incorporated with a capital stock of \$25,000 by Guy A. Blann, J. C. Huffman, B. E. Bean, and others, and will equip a cotton ginnery.

The Farmers' Gin Co., Dermott, Ark., has been incorporated with a capital stock of \$30,000 by G. W. Lambert, E. P. Remley and W. E. Lephieu, and will equip a cotton ginning plant.

The Middle West Gas & Electric Co., Springdale, Ark., has bought the Springdale Light & Power Co.'s plant and will add to the equipment to furnish power and light for several towns. The expenditure of about \$75,000 for machinery is contemplated.

The Wilson Coal & Ice Co., Wilson, Ark., has been incorporated with a capital stock of \$25,000 by λ . B. Hill, R. E. Lee Wilson and T. A. Gillette and will install equipment for the manufacture of ice.

The Monroe Power Screw Driver Co., Shawnee, Okla., has organized and will receive bids in 60 to 90 days for air or electrically driven equipment for its manufacturing plant. L. C. Webster, box 12, may be addressed.

The O. K. Storage Battery Co., Oklahoma City, Okla., has been incorporated to manufacture storage batteries, with a capital stock of \$100,000, by A. F. Fricks, Earl Rueb and C. F. Wilson.

The Reedy Auto Truck & Trailer Co., Tulsa, Okla., has been incorporated with a capital stock of \$50,000 by James J. H. Reedy, G. C. Bizzell, and others.

The Richardson Aeroplane Co., New Orleans, La., will build an addition and install new equipment for the manufacture of aeroplanes.

Texas

AUSTIN, TEX., July 7.

The machinery and tool trades showed unexpected dullness the past week. It is reported, however, that many orders of considerable magnitude are pending, particularly for heavy machinery. Crop conditions show a material improvement.

The Texas & Pacific Coal Co., which has 25 producing natural gas wells near Thurber, with a total daily capacity of about 50,000,000 cu. ft., has finished the survey for a pipe line to run from Thurber to Fort Worth and Dallas.

Swift & Co., Chicago, have awarded a contract for the construction of a cotton seed oil refinery at Houston, to cost \$250,000. The plant will include a four-story refinery, two-story packing house, boiler and engine building, office building, black grease plant and storage tanks.

The De Leon Compress & Warehouse Co., De Leon, incorporated with a capital stock of \$40,000, will install additional machinery in its cotton compresses at De Leon and Cisco.

The Hardwick-Roberts Heater Co., Fort Worth, will build a factory to cost about \$50,000, to make a device for heating automobiles.

The Atlas Wind Mill Co., incorporated at Wichita Falls, will build a plant to cost about \$150,000, to manufacture wind mills. J. E. Robertson, Mineral Wells., Tex., is president.

California

San Francisco, July 3.

Aside from Government work and work more or less directly dependent on Government demands, the inquiry for machinery and tools has eased off. A good demand is noted for second-hand machinery. A lot of old machinery abandoned for years and no longer usable is being sold for scrap. In one case machinery from a lumber mill burned twenty years ago has been unearthed and shipped to San Francisco for scrap.

The round house, machine shop and blacksmith shop of the Verdi Lumber Co., Verdi, Nev., was burned last week with a loss of between \$50,000 and \$60,000. The shops and round house will be replaced as soon as the equipment can be secured.

The Bean Spray Pump Co., San Jose, Cal., is increasing its capital stock from \$500,000 to \$1,000,000, a part of the additional capital to be used in building and equipping an additional foundry, blacksmith shop, warehouse, and in the purchase of new machine tools, and the remainder for working capital. A frontage of 540 ft. has been secured.

The Craig Shipbuilding Co., Long Beach, Cal., has increased its capital stock \$500,000.

The Benicia Shipbuilding Co., has increased its capital stock by \$200,000, to be used in equipping a shipbuilding plant on San Francisco Bay.

The Edwin Forrest Forge Co., Oakland, Cal., has bought 40,000 sq. ft. on which it will erect shops for making cams, cranks, steamboat shafting, ship smithing and other machine forgings.

The Stuart Machine Co., San Francisco, has been incorporated with a capital stock of \$12,000 by W. A. Plummer, E. A. Bruer, John L. Stuart, Edwin B. Thoming and W. R. Morris to manufacture a machine for inserting grommets and eyelets in canvas.

The Hollywood Shipbuilding Co., Oakland, Cal., has been organized and will be incorporated with a capital stock of \$1,500,000 by David Hollywood, Frank J. Woodward, J. F. Carlson, Arthur Arlett, E. C. Proctor, Hiram Johnson, Jr., F. W. Hollman and Clarence J. Berry. The company has secured a site of 26 acres with 1000 ft. of water frontage on San Francisco Bay. It has received Government contracts for six steel steamers of 8800 tons each.

The Bern Shock Absorbing Wheel Co., San Francisco, has been incorporated with a capital stock of \$50,000 by J. P. Bern, E. B. Cushman, C. Vargas, L. L. Levinson and O. L. Berry.

J. A. Johnson, San Francisco, and E. B. Noble, Berkeley, Cal., have bought property on the water front at Benicia, Cal., to be used as a site for a shipbuilding plant.

The C. L. Best Gas Traction Co., San Leandro, Cal., will double the capacity of its traction engine manufacturing plant.

The Globe Foundry & Mig. Co., Berkeley, Cal., has been incorporated with a capital stock of \$50,000 by A. J. Tucker, R. S. Elliott and H. R. Elliott.

The Engineering Products Co., San Francisco, has been

incorporated with a capital stock of \$10,000 by Louis P. Howe, M. Syme and A. H. Picketts.

The Los Angeles Shipbuilding & Dry Dock Co., Los Angeles, will erect a two-story plate shop, about 66 x 320 ft., at its shipbuilding plant now in course of erection on Smith Island, to cost \$10,000. The company has also filed plans for a one-story shop building, 20 x 100 ft. S. L. Napthaly is vice-president and general manager.

The Hobbs Storage Battery Co., Los Angeles, has been incorporated with a capital of \$100,000 to manufacture storage batteries and other electrical equipment. A. A. Hobbs, A. W. Bumiller, S. M. Haskins and H. V. Andrews are the incorporators.

The Pacific Glass Casket, Co., 416 Merritt Building, Los Angeles, has filed plans for the construction of a one-story machine shop on Twenty-second Street, Santa Monica.

C. E. Fulton, Los Angeles Harbor, San Pedro, operating a shipbuilding plant on Morman Island, is planning to increase the capacity of the present works to provide for the construction of several vessels simultaneously.

The Interlocking Marine Device Co., Los Angeles, has been incorporated with a capital of \$10,000 to manufacture a device for marine service. The incorporators, all of Los Angeles, are E. Avery Newton, A. H. Koebig, and Henry W. Schlueter.

The American Carbon Co., Los Angeles, has been incorporated with a capital of \$350,000 to operate a local works for the production of carbon and allied specialties. Henry N. and John B. Livezey, and Walter W. Evans, Jr., Los Angeles, are the incorporators.

The Banning Ship Yard, Los Angeles Harbor, San Pedro, operating a shipbuilding plant at the south end of Morman Island, will install new machinery and equipment to increase the capacity of its works. The company has received a contract from the Government for two standard-type vessels, each 280 ft. in length, and plans to inaugurate immediate construction. William Muller heads the company.

The Tracy Engineering & Shipbuilding Co., San Diego, Cal., recently incorporated to acquire the works of the Tracy Brick & Art Stone Co., near San Diego, is reported to have awarded contracts for the remodeling of the plant for shipbuilding work, including the erection of new structures. New machinery will be installed. Theron H. Tracy, 1621 Grand Avenue, Los Angeles, is president.

The Pacific Northwest

SEATTLE, WASH., July 3.

The Anaconda Copper Mining Co., Great Falls, Mont., announces that work will begin immediately on the construction of a rod and wire mill to cost \$500,000.

Fire originating in the engine room destroyed the plant of the Panama-Eastern Lumber Co., Hoaquiam, Wash., with a loss of about \$200,000.

The Eagle Brass Foundry, Seattle, will construct a two-story foundry building, 90 x 105 ft., to cost 6,000. A pattern shop, 25 x 29 ft., will also be built.

The City Council, Tacoma, Wash., has approved the proposed purchase of the electric power site, owned by P. H. Hebb, for \$1,000,000, and its subsequent develoment to 125,000 hp., at an additional expenditure of \$2,225,000.

The plant of Wynkoop Brothers, boat manufacturers, 209 Bancroft Street, Portland, has been destroyed by fire. It will be rebuilt immediately.

The Clark Creek Lumber Co.'s mill at Kelson, Wash., which has been idle for several years, will be reopened by William Robb and William Clark, owners. Extensive repairs will be made and new machinery installed. The mill has a daily capacity of 35,000 ft.

The Stewart Brothers Co., Portland, Ore., has leased property on which will be erected a plant to manufacture logging supplies, including wire rope and blocks. It will be associated with the Hofius Equiment Co., with R. A. Stewart, chief executive. The Hofius Equipment Co. manufactures locomotives, rails, switch materials and other railroad supplies.

The Western Reduction Co., Portland, manufacturer of novelties, will construct a factory, 100×150 ft., and a power house, 14×32 ft., at Twenty-fourth and Nicolai streets.

The Snohomish Iron Works, Everett, Wash., is equipping its plant with new machinery, which will considerably enlarge its capacity.

The Olympic Steel Works, 5200 Ninth Avenue, Seattle, has completed plans for the erection of foundry, 73 x 102 ft., to cost \$6,000.

Canada

TORONTO, July 9.

The plant which is being erected at New Toronto, Ont., for the Goodyear Tire & Rubber Co., at a cost of \$1,500,000, is practically completed, and will be ready for the manufacture of automobile, motor cycle, bicycle and airplane tires about Aug. 1. It will employ 1500 men and women, and will have a daily output of 3000 automobile tires alone. This factory is one of six which the company proposes to erect on its 27-acre site at New Toronto, as soon as expansion is necessary.

The Corrugated Paper Box Co., Ltd., 187 Geary Avenue, Toronto, is in the market for a 6-ft. center, 18-in. swing lathe.

Kruk Brothers, Ltd., Chesley, Ont., is in the market for a dynamo, 110 volt, direct current, with about 500 lights.

The F. E. Combe Furniture Co., Kincardine, Ont., is in the market for a 100-hp., horizontal boiler; must pass Government inspection.

The Canadian Sprinkler Equipment Co., Ltd., Toronto, has been incorporated with a capital stock of \$50,000 by John G. Leckie, George G. Beckett, John A. Kent and others, to manufacture automatic sprinklers, fire extinguishers, etc.

The Power Development Co., Ltd., Montreal, has been incorporated with a capital stock of \$500,000 by Gerald A. Coughlin, Francis G. Bush, George R. Drennan and others, to carry on the business of furnishing electric light, heat and power.

The Clemens Electrical Corporation of Canada, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$50,000 by Henry N. Kittson, Alexander Metherell, William D. Dailey and others, to manufacture electrical appliances, machinery, etc.

The Lynn Rubber Mfg. Co. of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$10,000 by Charles G. Derome, Jules Bruneau, Jean Ducharme and others, to manufacture rubber goods, etc.

The Farmers Supply Co., Ltd., Winnipeg, has been incorporated with a capital stock of \$250,000 by Frederick M. Burbridge, David L. Bastedo, Robert C. McPherson, to manufacture tractors, engines, implements, etc.

The Globe Engineering Co., Ltd., Hamilton, manufacturer of implements, machinery, etc., has been incorporated with a capital stock of \$100,000 by Ivor D. Lewis, William F. Coote, Russell W. Treleaven and others, to take over the plant and business of the Globe Electric Machine Co., Ltd.

The Maritime Electric Co., Ltd., Fredericton, N. B., has been incorporated with a capital stock of \$1,000,000 by John J. F. Winslow, John J. McCaffrey, Ernest A. McKay and others, to build and operate plants for generating electric light, heat and power, etc.

The Frasers Companies, Ltd., Plaster Rock, N. B., has been incorporated with a capital stock of \$10,000,000 by Donald Fraser, Plaster Rock; Archibald Fraser, Fredericton; William Matheson, Andover, N. B., and others to take over the business now being carried on by Donald Fraser & Sons, Ltd., and several other lumber companies operating in New Brunswick and Quebec provinces.

Structomode, Ltd., Hamilton, has been incorporated with a capital stock of \$5,000 by George W. Ballard, Minnie E. Stowe and others, to manufacture models from iron, wood, steel, etc.

The Fox Chain Co. of Canada, Ltd., Hamilton, has been incorporated with a capital stock of \$200,000 by Cecil V. Lang, Ewartt G. Binkley, Nellie Moore and others, to manufacture anti-skid chains, automobile parts, tools, etc.

The Arrow Optical Co., Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by John Brisacher, Emil Deuber, Thomas E. Willan and others, to manufacture optical goods, jewelry, watches, etc.

The Canadian Consolidated Rubber Co., Kitchener, Ont., will build a brick addition to its machine shop to cost \$15,000. F. C. Harding is manager.

The Brunner Mond Co., Amherstburg Ont., is in the market for two electric hoists, 35 hp., two drum.

The Hamilton Steel Wheel Co., Hamilton, will erect an addition to its factory to cost \$25,000.

The New Westminster Construction & Engineering Co. is clearing a site on Poplar Island, B. C., for the erection of a shipbuilding plant, and will construct a bridge from the foot of Third Avenue, New Westminster, to connect the island. The company has secured contracts from the Imperial Munitions Board, Ottawa, for building four wooden steamers 250 ft. long by 44 ft. beam.

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